Stockton-on-Tees Corporation.

URBAN DISTRICT COUNCIL.

REPORT

OF THE

Medical Officer of Health

FOR THE YEAR 1895.

Stockton-on-Tees:
Printed at the office of J. Sharp, 7, Silver Street.
1896.

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STOCKTON-ON-TEES,
27th March, 1896.

To the Urban District Council of the Borough of Stockton-on-Tees.

Gentlemen,

I have the pleasure, agreeable to Article 18, Section 14, of the General Order of the Local Government Board, dated March, 1891, to submit for your consideration, as Medical Officer of Health for the Borough of Stockton-on-Tees, my first Annual Report.

My duties in the above capacity commenced on 3rd July, 1895, and the text of this Report will therefore, except incidentally, deal solely with the period which elapsed between that date and 31st December last. In the statistical and tabular portions of the Report, however, I have thought it expedient to include the whole of the year, inasmuch as it is customary when dealing with vital statistics to compute birth, death and other rates for annual periods. Rates per year are very convenient, and are also more useful as standards of comparison than are rates for shorter periods.

The year 1895 having seen the inauguration of an extended regime in the Council's Health Department, it may be permissible to congratulate the Council on its appreciation of the importance of sanitary progress, as evidenced thereby. There can, I think, be no doubt that every town approaching Stockton-on-Tees in size and importance, should have a Medical Officer to devote his time to the interests of Public Health, and I hope the time is not far distant, when populous towns throughout the country will universally recognise, that without such an Officer their Sanitary Staff is incomplete. To speak of your district, I do not hesitate to express the opinion that if its sanitary condition is not greatly improved, and if the health, happiness and prosperity of its inhabitants are not appreciably increased by the advance referred to, it will be owing to the fault or misfortune of your Officer, and not because his post savours in the least degree of a sinecure.

The Stockton Urban Sanitary District is a part of the Union of the same name. It is situated near the south-eastern limits of the County of Durham, on the north bank of the River Tees, which constitutes the boundary between the Counties of Durham and Yorkshire. The river flows along the margin of the district in a serpentine manner, at first in a northerly and afterwards in an easterly direction. The area of the district is 3344 acres, and its present rateable value is £177,611. It is bounded on every side, except where the Tees separates it from Yorkshire by the Rural Sanitary District of the Stockton Union. There is a small stream in the district known as the Lustrum Beck. It flows at first in a northerly direction alongside the western margin of a portion of the district, then in a north-easterly direction within the district, and finally nearly due east alongside the northern boundary of another portion. In relation to most of the surrounding country the situation of Stockton-on-Tees is low. To the north-east of the town, on the left bank of the river and to the east of the Borough, on the right bank of the Tees, however, there is flat and lower lying land, extending in the direction of the river mouth. The general level of the district is from 5·52 feet to 61·1 feet above Ordnance datum. There is no dwelling in the district on a lower level than 12·40 feet above Ordnance datum. Geologically, the district is situated on a thick bed of diluvial clay, below which is the New Red Sandstone formation. The surface soil is clay.

Starting from an ancient single long street, near the eastern margin of the Borough as now constituted, Stockton town has spread in every direction, except where checked by the river. The district is divided, for municipal purposes, into ten Wards, numbered and named as follows:—1, Portrack; 2, Tilery; 3, Victoria;

4, South-East; 5, North-West; 6, Central; 7, Exchange; 8, West-end; 9, Parkfield; 10, South-West. The four first named of these are situated to the east, and the six last named are situated to the west of the High Street—a wide handsome picturesque thoroughfare, having a direction nearly due north and south.

The character of the dwellings vary in different parts of the Borough.

Omitting an unimportant number near its southern extremity, the majority of the buildings in the South-East Ward are very old. Many, which were once important residences, are now occupied as tenement dwellings, others are Common Lodging Houses, and others are used as offices, warehouses and such like. Branching off from both sides of High Street there are many closely built yards, in which are numerous dwellings of the poorer classes. Speaking generally, there is in these localities considerable overcrowding of houses upon area, consequently provision for light, air and ventilation is in many parts defective. Although the houses in the other parts of the district are mostly of newer date than those referred to, there are many streets of small houses built apparently without the least regard to the proper provision of those essentials to health which I have named. Such streets, for instance, are Henry Street and Caroline Street in Portrack Ward, Bath Street and Haffron Street in Victoria Ward, Henzell Street and Clarence Street in the North-West Ward, and East Street and West Street in the Central Ward. There are a few back-to-back houses in the Central and North-West Wards. The larger class of houses in the district are situated chiefly in the South-West and West-End Wards. They have for the most part fair open spaces in front, and a fair yard area behind. Building operations have not gone on as briskly lately as they did a few years back, but there have been altogether, within the last two or three years, a good number of dwellings almost entirely for the accommodation of the artizan classes erected in the Central, North-West and West-End Wards, besides a few houses of larger sort in the South-West Ward.

POPULATION.

According to the census of 1891, Stockton-on-Tees had a population of 49705 persons living in 8765 houses. At the census of 1881 the people numbered 41015, so that during the ten years there was an increase of 8690 persons. I estimate the population at the middle of 1895 to have been 54000. These figures are arrived at on the assumption that the population continued to increase subsequent to the last census (1891) at precisely the same rate that it did during the ten years 1881 to 1891. This proposition is, of course, purely discretionary, but the Registrar-General bases his method of calculating populations upon it, and on the whole it is as convenient, and, when checked by any applicatory local observations, as reliable a plan as can be adopted.

Remembering the criticism offered to this estimate, on its presentation to the Council in my fortnightly report, dated 16th August, 1895, I have checked it in the following manner:—1st.—I calculated the number of persons per inhabited house in each Ward from the returns of the 1891 census. 2nd.—I added the number of houses built in each Ward since 1891 to the number that were inhabited in each Ward respectively, as shewn by the census returns of that year. 3rd.—I multiplied together the two results obtained for each respectively and, finally, added the products. This method yields 53994—a number remarkably near my previous estimate.* In the calculation I took no account of the number of uninhabited houses at either of the two periods.

The population of the district is essentially industrial. Large numbers of men are employed in the iron trade in its various branches. An extensive iron ship building yard, large marine and other engine works, brass foundries, brick yards, timber yards, a brewery, a pottery, and flour mill, give employment to many hundreds. A considerable number are employed by the North-Eastern Railway

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*Although by the Stockton-on-Tees Extension Act, 1889, which was passed between the censuses of 1881 and 1891, there was some addition made to the population, it was so inconsiderable that I have ignored it in my calculations.

Company, and not a few find work about the Quay in connection with shipping. A number of females are employed in confectionery works, mineral water manufactories, printing works, and brush factories. Many others are employed in lighter kinds of labour, such as dressmaking and the like.

Excrement Disposal.—The method of excrement disposal most generally adopted in the district is by the common privy and ashpit combined. A large number of movable pans are also used in the district. Almost all the better class houses, and a few of the smaller houses, are provided with water closets. In addition to these, there are a good many outdoor slop water closets (Duckett's Patent) in use. The contents of the privy middens are removed monthly, while the movable pans are emptied weekly; by the Authority's staff. Commonly, in process of removal, the night scavengers deposit the soil from both kinds of receptacles on to the street in heaps. It is afterwards shovelled into carts and conveyed either to the depôt, some 1½ miles from the town; or to the Railway siding, from whence it it consigned to farmers. That portion taken to the depôt is disposed of for manure as opportunity offers. Especially in the older parts of the town, large numbers of the privies are very near to dwellings. In very many instances the soil is carried through the dwelling. Almost all the vaults in connection with privies are exceedingly capacious. The vault floors are frequently sunk below the surrounding ground level, and are as often pervious. The brick walls of the vaults are usually unprotected with any impermeable material, and consequently they soak up liquid filth to saturation limit. By their roughness they favour adherence of filth to their surfaces. The plan on which the privies are usually constructed offers no facility for the application of dry ashes to the excrement, consequently it is common to find a heap of excrement surrounded by liquid filth in one part of the pit, and a heap of ashes at a distance. It is perfectly impossible to effectually cleanse vaults of this description; moreover, as can readily be conceived, when once such receptacles become specifically contaminated by the dejections of anyone suffering from such diseases as enteric fever or cholera, they may be a source of danger after even the best attempts have been made to disinfect them.

The movable pans referred to might, if their contents were kept dry by the admixture of a sufficient quantity of dry ashes, and if they were emptied sufficiently frequently, be tolerable, but used as they generally are they are productive of grave and dangerous nuisance.

In practice in large communities it is found that the conditions on which the satisfactory working of all conservancy systems depend are extremely difficult, or impossible, of acquisition. Having presented a special report, dated 20th September, 1895, however, on the subject of excrement disposal, which I regret the Council have not yet considered, I need only here respectfully refer them to it for my views on the question.

House refuse is for the most part got rid of by throwing it into the ashpit middens, but there are an increasing number of householders who have movable covered receptacles, the contents of which are removed weekly. The refuse eventually finds its way to the nightsoil depôt.

Sewerage and Drainage.—The district is without a complete system of sewerage. Sewers of a certain kind—some few constructed on modern but the majority on old and obsolete lines—exist throughout the town. Regarding the old sewers I am not able to say much, as insuperable difficulties have been experienced in attempts to obtain reliable information about them. As can be well understood, when it is remembered that these sewers were constructed in great part in days when the importance of sewerage was very feebly recognised, no plan shewing the details is forthcoming. Similar remarks will apply with still greater aptitude, regarding inquiries concerning many of the private drains of the district. In numberless instances, when information has been sought as to the position, character, direction, or condition of these, little or none could be got.

What facts have been ascertained relating to both sewers and drains are (with certain few exceptions), I regret to say, not such as tend to give any sense of safety or satisfaction.

Flooding of cellars and basements with sewage has not been at all uncommon in many parts of the district. Such undesirable event has occurred in Yarm Road, in the Lightpipe Hall Estate, in High Street, Maritime Street, and Middle Street, as well as in other localities. The old sewers are badly made, the gradients of some of them are faulty, they are frequently leaky and without efficient ventilation, and they are devoid of arrangement for adequate flushing. All the sewers eventually discharge into the River Tees at various points.

The private drains are far too commonly of inferior workmanship, and their connections with the sewers are often found to be imperfect. Gulleys and traps of proper kind are employed as a rule throughout the district, but they are not seldom found to be imperfectly fixed. Soil pipes in the district are almost invariably vented. It is quite a rare thing to find any aerial disconnection between house drains and the sewer. The trapping of sink and other wastes, which are, however, as a rule, disconnected, is often found to be neglected.

During the last few years certain sewers have been constructed on modern lines and, as I understand, these are intended to form eventually, sections of a complete system. No plan, however, has been prepared which shows the details of the anticipated scheme, so that there is constant danger of discovering that local extensions will not accommodate themselves in the most desirable manner to sections which have already been constructed. A plan of the nature indicated should be prepared. Record could then be made of the connections of the various divisions, and of the connections of sub-divisions at the time of their insertion.

Chief among the modern sewerage work is an intercepting sewer, about 4 miles in length, which was constructed in 1892. This sewer has its summit at a point near the south-western extremity of the Borough. Proceeding thence in a northerly direction, it soon curves towards the north-east, and afterwards towards the east, running all the while fairly parallel with the Lustrum Beck. It eventually discharges into the River Tees, about 2 miles below Stockton town. From its commencement to near Hartburn Road it is a 12-inch pipe sewer, from thence to near Norton Road it is formed of 18-inch pipes, and from thence to the outfall it is a 4-feet brick elliptical sewer. It is provided with manholes covered by gratings at distances of about 500 yards. At a point about one-third of a mile short of the outfall there is a large tank, about 60 feet by 18 feet, which is divided longitudinally into two sections, each of which is furnished with a sluice gate, thus enabling each section to be used independently of the other. In these sections there are at intervals, and springing alternately from one side and the other, vertical brickwork piers, extending half way across the sections, in order to check the current and facilitate deposition of the solid matters. No precipitant is used. The sludge is emptied at intervals.

Main sewers, also of recent construction, pass along Hartburn Lane, Oxbridge Lane, Durham Road, and part of Norton Road, and are connected with the intercepting sewer already described. The one in Oxbridge Lane was constructed in 1892. It is of 18-inch pipes. It commences near the Railway Subway, and proceeds westward to near the Oxbridge. It now accommodates, I am informed, the whole of the district which lies immediately on both the north and south sides of Oxbridge Lane, to the west of the North-Easern Railway. Previous to last November only certain connections had been made with this sewer, but at that time junctions were effected between it and the rest of the sewers in the locality alluded to.

There is but little efficient ventilation of the various sewers in the district. Where attempt at ventilation is made it is chiefly by means of pipe shafts carried up buildings. In addition, there are a few lamp post ventilators. As pointed out in my fortnightly report, dated 7th November, 1895, I do not regard these as efficient means of sewer ventilation. Doubtless they tend to relieve pressure, and by so doing are useful in lessening the risk of pent up gases reaching the interior of houses by the forcing of traps, but they do little more. It is not to be expected that a few shafts of comparatively small sectional area, having often horizontal arms and acute angles (factors productive of friction, and therefore of impediment to the passage of gases through them) can adequately ventilate sewers. These shafts should be considered as vents only.

To effectually ventilate any space, it is equally important that inlets as well as outlets should be provided. The most practical method of ventilating sewers is, in my opinion, by grated openings, leading directly into the sewer from the roadway, at intervals of not more than 100 yards distant one from another. Some of these will act as inlets and others as outlets, according as the prevaling climatic conditions may vary, and according to the state and flow of the sewage. It must not be supposed, however, that this method is free from objection if applied to sewers of bad construction, of improper calibre, of faulty gradient, or to sewers that are insufficiently flushed, and which in consequence become "sewers of deposit." The true remedy for objectionable manifestations in these circumstances is to substitute satisfactory for dangerous sewers, to ensure proper flushing, and to provide, if necessary, still more openings. Shafts at the blind ends and highest points of sewers are excellent as auxiliaries.

Water Supply.—The district is supplied with water by the Stockton and Middlesbrough Corporations' Water Board, whose Act was passed in 1877. The Board's gathering ground consists of extensive tracts of country, almost entirely moorland in character, near the North-West limits of Yorkshire. A reservoir, known as the Hury reservoir, constructed in the valley of the Balder, which is the natural watershed, impounds the water. From thence it is conveyed in iron pipes to settling tanks and filter beds, near Darlington, and after undergoing filtration is pumped into two service reservoirs, one near Fighting Cocks, the other near Sadberge. From these the water is distributed by gravitation in iron pipes throughout the district, and is laid on by communication pipes to almost every house. The service is "constant." Owing to the peaty nature of the soil of the catchment area the water is never free from colour. After heavy rain it is often very dark coloured, and it not only presents at such times an uninviting appearance, but it also has a distinct odour and an unpleasant taste. To remedy these defects, the Water Board have nearly completed the construction of another reservoir, known as the Blackton reservoir, higher up the Balder valley than the Hury reservoir. This will enable "sorting" to be done, so that water will only be impounded in the Hury reservoir for supply when it is comparatively clear. In addition, the Board intend to filter the water more efficiently than they are able to do at present and, with this object, are about to commence the construction of extensive filtering works near Lartington. The need for pumping the water into the service reservoirs will by this means also be avoided. Although, as already stated, the water frequently possesses certain undesirable properties, these do not, in my opinion, prevent it being considered a safe drinking water. For other domestic, and also for trade purposes (except perhaps for the manufacture of beverages) it is very suitable. The results of chemical analysis support this opinion. I have no doubt that when the works of which I have spoken are completed, the water supply of the district will be as perfect as can reasonably be desired.

Adoption of Optional Acts.—Notification of Infectious Disease is compulsory under the Stockton-on-Tees Extension Act, 1889. The diseases mentioned in the Act are the same as those scheduled in the Infectious Diseases Notification Act, 1889, with the exception that Erysipelas is not included. I advise the Council to add Erysipelas to the list of infectious diseases required by them to be notified. Under certain circumstances, the knowledge that would be gained thereby might be of great service. For instance, it is especially dangerous for recently confined women, and for persons suffering with wounds, to be exposed to the germs of Erysipelas, and in such contingencies valuable precautionary measures might be taken which, in the absence of notification, might be omitted.

The Council have already adopted Part III. of the Public Health Amendment Act, 1890.

I advise the adoption also of The Infectious Diseases Prevention Act, 1890. The Authority would thereby acquire important powers and duties in cases where the Medical Officer has evidence that any person in the district is suffering from infectious disease, attributable to milk obtained from any dairy situated either within or without the district. The following subjects, also, are dealt with more expeditiously under Sections of this Act than under The Public Health Act, viz.:—1.—Disinfection of infected houses and articles. 2.—Prompt interment of bodies dead from infectious disease. 3.—Detention in Hospital of persons suffering from infectious disease. 4.—Disposal of infectious rubbish.

Bye-Laws.—Bye-Laws, having the force of Statute law, which were sanctioned by the Local Government Board on 26th April, 1879, with respect to Common Lodging Houses, and Bye-Laws, which were allowed on 26th May, 1879, with respect to Slaughter Houses, are in force in the district.

There are no bye-laws, however, with respect to any of the following important matters:—1.—The prevention of nuisances. 2.—New streets and buildings. 3.—Houses let in lodgings (or tenements). 4.—Offensive trades.

The Council would do well to frame bye-laws on these subjects. Especially is it desirable they should do so with respect to the prevention of nuisances, and with respect to new streets and buildings. Without bye-laws for the prevention of nuisances, and for the regulation of offensive trades, the Sanitary Staff is heavily handicapped in the attempts they make to maintain wholesome conditions. It is no exaggeration to say that numbers of nuisances originate, and that others recur over and over again, which might be prevented if bye-laws, for their prevention rather than cure, were adopted and enforced. Equally, if not more pressing, is the need for building bye-laws. During the last few years many dwellings have been erected which will, I believe, in a few years time become insanitary. Moreover, jerry building is going on at the present time. Quite recently I witnessed the laying of the foundations of certain dwellings, and watched the progress of the houses subsequently. No trench of any kind was dug for the foundations, and the bricks were laid on the surface of the bare ground. There was no preparation whatever of the site, which was entirely upon ground which had been *made* for a depth of several feet only a few weeks before. No damp-proof course was inserted in the walls, many of which are, in my opinion, very inferior specimens of the builders' art. Speculative builders who build this class of property can scarcely be blamed if the Sanitary Authority allows them to do so; but, surely, the district should be protected against the establishment of conditions which must inevitably ere long menace the well-being of no inconsiderable section of the community. I understand that Building Bye-Laws, drafted by the Council, were submitted to the Local Government Board for approval some time ago, but that in consequence of the dimensions that were proposed for timbers the Board declined their sanction. I suggest that further application be made to the Central Authority, and in the event of their still refusing sanction, that a conference be sought with the Board's Officials. No doubt the matter could then be arranged satisfactorily.

Regulations under the Dairies, Cowsheds and Milkshop Order of 1885, adopted by the Council, are at present before the Local Government Board for approval.

VITAL STATISTICS.

Births.—During the year, 1630 births (800 being of males and 830 of females) were registered as occurring in the district. The annual birth rate was therefore 30·18 per 1000 of population.

Deaths.—The deaths registered during the year numbered 1008—520 being of males and 488 of females. Of this number 18 were among persons not belonging to the district. On the other hand 13 persons died out of the district who belonged thereto. Correcting the number registered in respect to both these classes of cases, the number to be allotted to the district is 1003, yielding an annual death rate of 18·5 per 1000. The "natural increase" of population was, therefore, 627.

Zymotic Death Rate.—The subjoined Table shows the number of deaths from each of "the seven principal Zymotic diseases." In all they numbered 244, yielding a Zymotic death rate of 4·5 per 1000 per annum. Seeing that the Zymotic death rate for England and Wales, during the decennium, 1881-90, was 2·34, this must be regarded as high, and when we find its height due, in great measure. to deaths from Diarrhœa, Gastro-enteritis, Enteric Fever, and Diphtheria, it must, I think, be taken to point to a defective sanitary state.

TABLE I.—Showing the number of deaths from the Principal Zymotic Diseases, in the ten years, 1886 to 1895.

	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	Annual Average of 10 years.	Proportion of Deaths to 1000 Deaths in ten years.	Total Deaths in 1895.	Proportion of Deaths to 1000 Deaths in 1895.
SMALLPOX	...	1	...	...	...	...	1	...	...	...	0·2	0·25	......	......
MEASLES	7	20	1	46	17	26	46	3	38	...	20·4	26·0	......	.. ...
SCARLET FEVER ...	6	5	3	17	12	6	5	...	18	32	10·4	13·2	32	31·7
DIPHTHERIA ...	7	11	6	9	12	9	12	10	21	12	10·9	13·9	12	11·9
WHOOPING COUGH	22	6	26	22	20	9	36	5	4	47	19·7	25·1	47	46·6
FEVERS—TYPHUS	...	...	...	...	...	..	..	. .	...	1	0·1	0·12	1	0·9
ENTERIC	10	16	3	9	45	45	8	11	10	21	17·8	22·7	21	20·8
DIARRHŒA ...	55	30	10	57	35	20	15	68	9	131*	43·0	54·8	131	129·9
	107	89	49	160	141	115	123	97	100	244	122·5	156·3	244	242·06

* Including deaths certified from Gastro Enteritis and Gastro-Enteric Catarrh.

"Infant Mortality."—The number of deaths in infants under one year of age was 330, which yields an "infant mortality" of 202·4. This is a very high rate compared with the mean "infant mortality" for England and Wales, for the decennium, 1871-80, which was 149.

The proportion of deaths in children under one year of age to each 1000 of total deaths was 327·3, and the proportion of deaths in children under five years of age to each 1000 of total deaths was 500.

Tables "A" and "B," required by the Local Government Board to be appended to the Annual Reports of Medical Officers of Health, are appended.

Inspection.—The very important duty of inspection by myself, as required by Section 3 of the Order already quoted, has not been by any means altogether neglected, but owing to a combination of circumstances, over which I had no effective control, it has certainly not been as thorough as I could wish.

On accession to office several conditions, inimical to systematic inspection, confronted me. Among these were absence of adequate office accommodation for the Sanitary Staff. This tended to confusion in the department rather than to methodical work; and I regret to say this deficiency is not yet satisfactorily removed. Again, by reason of extensive prevalence of infectious disease, much time was occupied in making special inquiries, and in directing precautionary administration with respect to the particular localities and households affected. Moreover, owing to the gravity of many of the cases which were admitted into the Fever Hospital, a very large amount of time was taken up in attendance at that institution. Lastly, indisposition, unfortunately, twice interrupted my continuous attention to duty. I desire here to take the opportunity to formally thank two medical confrères who acted for me at those times. Dr. H. M. Hughes, Chairman of the Hospital Committee, very kindly proffered to superintend on one occasion, and Dr. J. W. Blandford, whose friendship and ready co-operation I have long enjoyed, acted for me on the other occasion. To both these gentlemen I tender my sincere acknowledgments and thanks.

Notwithstanding the hindering misfortunes indicated, systematic inspection was accomplished in certain localities. Conditions detrimental to public health, observed in the course of such inspections, were reported to the Council, either in my own or in the Sanitary Inspector's fortnightly reports, and as a result several insanitary dwellings were closed, numerous nuisances were abated, and not a few permanent sanitary improvements were effected. A house-to-house inspection was made by the Borough Engineer and myself, assisted by the Inspectors, in the following localities:—Foster's Yard, Hambletonian Yard, parts of Ramsgate and West Row, Exchange Yard, Victoria Yard, Little Brown Street, William Street, parts of Brunswick and Skinner Streets, York, Albion, John, East, West, Middle, South, North, and Smith Streets, Castlegate, Quayside, Black Bull, Dalton's, and William IV Yards, Clarence and Mason's Courts, Union Square, Henzell, Shakespeare, and Clarence Streets. The joint report of this inspection has, unfortunately, been delayed owing to the difficulty experienced by the Borough Engineer and myself in arranging for collaboration.

As to special inspections and inquiries, it may be said they have been constant. I have made it a rule to personally visit all dwellings wherein any case of typhus, enteric, or continued fever, or diphtheria has presented. I have also visited, in cases where it has appeared desirable, those dwellings in which scarlet fever has been known or suspected to exist. Numerous inspections have likewise been made at the request of the Sanitary Inspectors, in order to advise as to the best course to adopt with regard to particular circumstances prejudicial to public health. A special inspection was made by the Borough Engineer and myself, by order of the Council, regarding an alleged nuisance, which was said to arise from the Hartburn sewage farm, in the Rural Sanitary District. We found undoubted nuisance, which was abated by the Rural Authority on their attention being directed to it.

In response to complaint from 27 residents in the neighbourhood, an inspection was made of a refuse depôt at Bowesfield, near Tees Bridge, where rubbish was then burnt. Undoubtedly a serious nuisance was created thereby. The Council at once discontinued to use the depôt, and shortly after relinquished their tenancy of the place.

Another inspection showed a serious nuisance caused by a large accumulation of refuse, containing much organic material, in the Corporation yard.

On representation being made to the Borough Engineer most of the refuse was soon removed, and since that time only a very insignificant quantity of refuse comparatively, has found its way there. Still, only recently (2nd March) I saw a quantity of garbage, &c., deposited there which, in my opinion, should have been dealt with in a safer manner.

In course of the same inspection, another dangerous nuisance was observed, caused by the absence of suitable arrangements for cleansing the galvanized iron pans, which are supplied to houses invaded by typhoid fever for the reception of dejecta. These pans, fouled with specifically contaminated material, are attempted to be cleaned in a movable tank, which only contains a limited supply of cold water, aided by occasional recourse to a still more limited supply of warmed water. At the same time no drainage provision exists for the immediate spot, and the washings are allowed to soak away into the surrounding ground as best they can. A sewer is now in course of construction, which will allow a proper platform, together with adequate drainage, to be supplied, so that thorough cleansing of the pans, by the free use of disinfectants, and by means of a forcible jet of water from a hose, will be practicable.

I would here suggest that the "typhoid pans" are unnecessarily large. Considering they are required for the excreta of 24 hours only, pans having a capacity of one-fourth that of those at present used, would be ample. Small pans would cost less, they could be handled more conveniently, could be more easily cleaned, and they would not be injured so readily as large ones.

INFECTIOUS DISEASES.

The total number of cases of infectious disease notified during the year was 969, which is equal to an attack rate of 17·9 per 1000 of the estimated population.

Reference to Table II will show this number is greater by 296 than the number of cases notified in the previous year, and is also greater than the number of ascertained cases in any of the other 8 years which are included in the Table.

TABLE II.—Showing the number of Cases of Infectious Diseases Reported, and the Mortality therefrom, for the past nine years.

NOMENCLATURE OF DISEASE.	1887.*		1888*.		1889.†		1890.		1891.		1892.		1893.		1894.		1895.	
	No. of cases reported.	No. of deaths.	No. of cases reported.	No. of deaths.	No. of cases reported.	No. of deaths.	No. of cases reported.	No. of deaths.	No. of cases reported.	No. of deaths.	No. of cases reported.	No. of deaths.	No. of cases reported.	No. of deaths.	No. of cases reported.	No. of deaths.	No. of cases reported.	No. of deaths.
Smallpox	14	1	4	0	0	0	0	0	2	0	6	1	22	0	1	0	0	...
Scarlet Fever	43	5	120	3	229	17	324	12	148	6	110	5	86	0	527	18	732	31
Diphtheria and Croup ...	2	10	1	6	5	9	18	12	13	9	19	12	17	10	28	21	29	12
Typhus Fever	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	1	1
Typhoid Fever	38	16	14	3	36	9	396	45	271	45	56	8	175	11	91	10	187	21
Puerperal Fever	...	...	...	...	1	2	2	2	6	2	3	2	3	1	4	4	2	...
Continued Fever	..	...	...	...	2	2	68	2	88	4	15	...	39	2	22	1	18	...
Totals	97	32	139	12	273	39	808	73	528	66	209	28	342	24	673	54	969	65

* Notification of Infectious Diseases voluntary.
† Notification voluntary up to 31st October, 1889, after that date compulsory.

Looking to each different infectious disease it is seen that, in point of numbers, scarlet fever takes the first place with 732 cases, enteric fever comes next with 187, diphtheria next with 29, continued fever next with 18, puerperal fever next with 2 cases, and typhus fever last with 1 case. The three first named of these diseases retain the same order as regards the actual number of their fatal attacks as they hold in their degrees of incidence. When the case-mortality of these different diseases is considered the three first named assume an inverse order to that held by them when their incidence of attack is reckoned. Diphtheria had the highest case-mortality, viz., 41·4 per cent., enteric fever next, 11·2 per cent., and scarlet fever least, 4·2 per cent. The single case of typhus fever was fatal.

No mortality resulted from either continued or puerperal fever. Smallpox was absent throughout the year.

TABLE III.—Showing the number of cases of the various Infectious Diseases notified month by month during 1895.

DISEASE.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Scarlet Fever ...	74	36	36	33	42	44	80	105	89	74	59	60	732
Typhoid ,, ...	9	7	4	2	4	2	6	9	35	70	27	12	187
Continued ,, ...	...	...	1	1	1	...	4	2	1	3	2	3	18
Puerperal ,, ...	...	...	...	...	...	...	1	...	...	1	...	...	2
Typhus ,, ...	...	...	...	...	...	...	...	...	1	...	...	...	1
Diphtheria ...	3	...	2	3	...	2	...	2	2	4	5	3	26
Croup	1	...	...	2	..	...	...	...	...	...	...	...	3
	87	43	43	41	47	48	91	118	128	152	93	78	969

TABLE IV.—Showing the Ward-distribution of the various Infectious Diseases during 1895.

DISEASE.	No. 1, Portrack	No. 2, Tilery	No. 3, Victoria	No. 4, South-East	No. 5, North-West	No. 6, Central	No. 7, Exchange	No. 8, West-End	No. 9, Parkfield	No. 10, South-West	TOTALS.
Scarlet Fever	66	111	89	55	71	89	36	102	40	73	732
Typhoid ,, ...	8	26	19	14	14	20	10	46	10	20	187
Continued ,, ...	1	6	3	...	2	2	1	...	...	3	18
Puerperal ,, ...	...	1	...	...	...	1	...	...	...	...	2
Diphtheria and Croup	...	4	7	...	3	2	3	...	4	6	29
Typhus Fever	...	...	...	1	...	...	...	...	...	...	1
	75	148	118	70	90	114	50	148	54	102	969

Scarlet Fever.—Referring to the Diagramatic Chart, which shows the weekly rise and fall of this disease, it will be seen that scarlet fever assumed epidemic proportions, and was prevalent throughout the year.

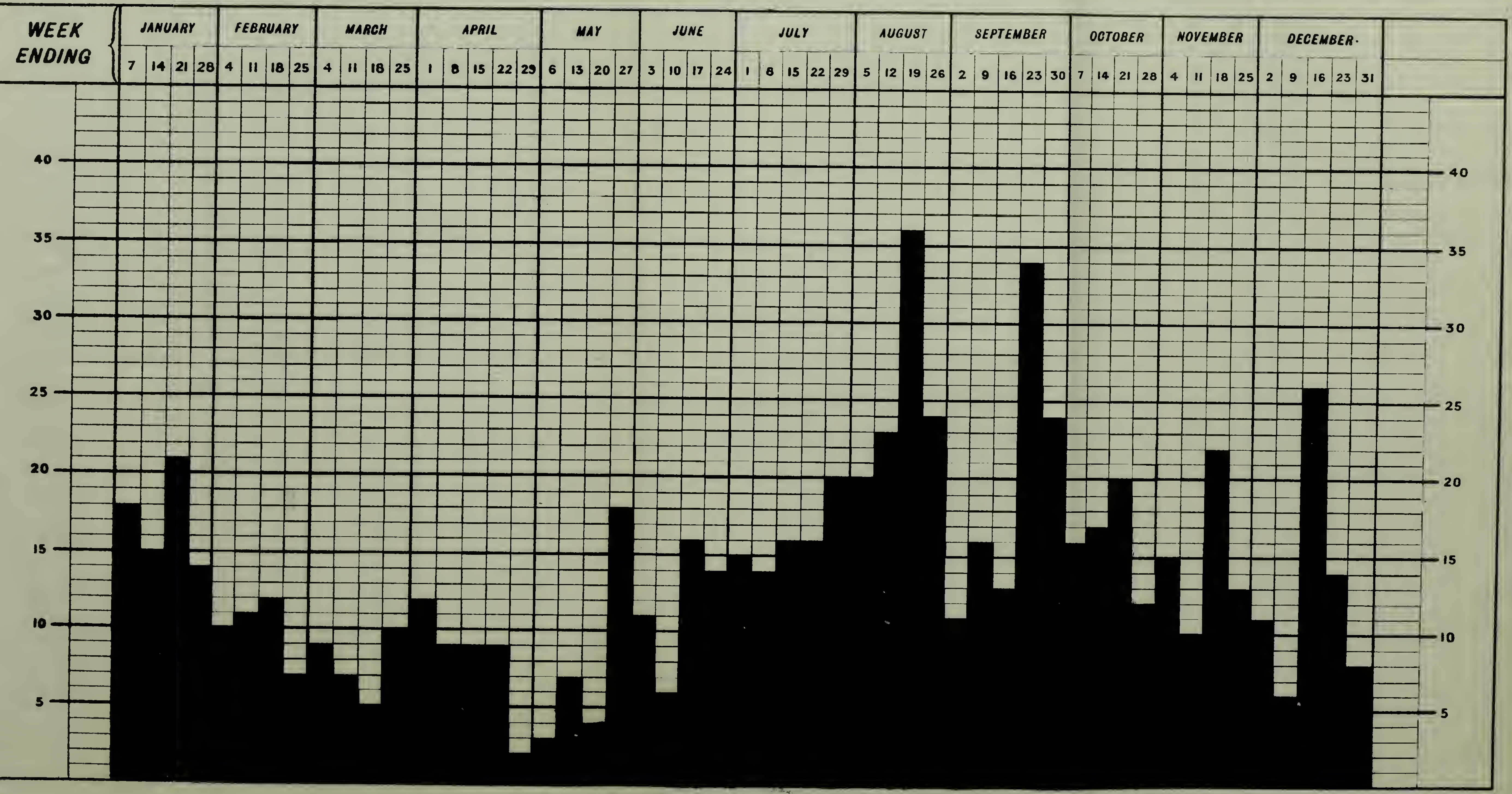
No single week passed without fresh cases being notified, and in all there were 732 cases. The week in which the smallest number of cases came to light was that ending 29th April, when only two were notified, while the week in which the largest number presented was that ending 19th August, when 36 cases were notified. The chart indicates clearly that the seasonal prevalence followed the recognized curve for this country, which shows that scarlet fever prevalence is least in Spring and greatest in Autumn. Although the incidence of attack was general throughout the district, it may be noticed from Table B that the Tilery Ward suffered most and the Exchange Ward least.

Fortunately the disease was of a mild type, only 31 of the 732 cases proving fatal, equal to a case-mortality of 4·2 per cent. Durham has for a long time stood high in the list of those counties in which the mortality from scarlet fever has been above the average. Bearing on this, the remarks of the Registrar-General in his 47th Annual Report are noteworthy. He says—" Scarlet fever is, for some " reason or other, most destructive in the industrial, and especially the mining " counties. . . . . The explanation that naturally suggests itself is that, probably, " the population in industrial and mining counties live in more than averagely close " aggregation, and that the spread of infection is thus facilitated."

Similar reason explains the greater prevalence of scarlet fever in urban than in rural districts. From these facts it may be deduced that by far the most common method of transmission of scarlet fever is by proximity to or contact with an antecedent case, or, through infected articles. Having dwelt on this theme in several of my fortnightly reports to the Council, however, and illustrated its truth at the same time by relating actual occurrences, it is unnecessary to do more than mention it here. Although then the potency of personal infection in spreading the disease may be accepted, it is, nevertheless, quite impossible to trace the succession of cases that constitute epidemic waves, such as that from which the district suffered in 1895. In many cases the source of infection was obvious at once on inquiry, but in numbers of other cases it could only be vaguely suspected after the most careful search.

The efforts made since July to check the spread of scarlet fever met with only partial success. This is not very surprising, if the many unfavourable circum-

DIAGRAMATIC CHART SHOWING THE WEEKLY RISE AND FALL THROUGHOUT THE YEAR 1895, IN THE NUMBER OF CASES OF SCARLET FEVER.



stances and difficulties that were encountered are considered. Among these may be mentioned—

1.—The large number of foci of infection that were scattered throughout the district.

2.—The mild character of the majority of the cases, which tended to induce indifference on the part of many of those whose families were attacked, and so to neglect of isolation.

3.—The occurrence of unrecognised cases.

4.—The limited hospital accommodation, compared with the number for whom admission was desired.

5.—The ineffectual system of disinfection of bedding, &c., at present in vogue.

Notwithstanding circumstances so adverse to complete success of attempts to check the disease, there can be no doubt whatever that the steps taken with that intent served good purpose. Removal to and isolation in hospital was most valuable. In many instances such proceeding not only reduced the number of infective centres, but it also acquired for many patients far better hygienic surroundings than they could otherwise have had, and so, undoubtedly, lessened the severity of their attacks. Constant vigilance was kept on the incidence of the disease upon school children, and every care was taken to prevent children from invaded houses attending school until risk of infection had disappeared. No indication suggesting the desirability of closing any school presented. In instances where the disease occurred on premises connected with milk traffic, washing of linen, and businesses involving the handling of food, removal of the patient to hospital was invariably effected, the sale of milk was suspended for a time, and care was taken to ensure thorough cleansing of the premises. In other respects none of the recognised precautions against the spread of disease were neglected.

Enteric Fever.—Year after year, for a long time, there has been undue prevalence of enteric fever in the Borough of Stockton-on-Tees. It is impossible to say with certainty how many cases occurred in each year prior to 1889, nor is that point of any moment now. As to the number of cases in each year since 1889 (the year in which notification of infectious diseases in the district became compulsory) reliable returns speak for themselves. The year 1890 was marked by an extensive epidemic of enteric fever, which attacked Stockton, together with several other places situated in the lower valley of the River Tees. In that year, in Stockton, 396 cases, causing 45 deaths, were reported; and since then the numbers in succeeding years were as follows:—in 1891, 271 cases with 45 deaths; in 1892, 56 cases with 8 deaths; in 1893, 175 cases with 11 deaths; and in 1894, 91 cases with 10 deaths. Arriving at 1895, it may be stated with truth that enteric fever was at no time during that year altogether absent, although there were in all 12 weeks out of the 52 during which no fresh case was notified. The total number of cases during the year was 187, being more than twice as many as in the preceding year, and a greater number than in any year since 1891. The number of houses invaded was 168. There was a plurality of cases in houses in 19 instances, viz., in one house there were 6 cases, in two houses there were 4 cases, in five houses there were 3 cases, and in eleven houses there were 2 cases.

During the first 26 weeks of the year 27 cases were reported at intervals in different wards, while in the latter half of the year 160 cases were notified. Reference to the subjoined Diagramatic Chart and to Table V, shows that cases were most numerous during the last, and were fewest during the second quarter of the year. This conforms with general experience, which teaches that prevalence of enteric fever in England has its maximum in the month of October, and its minimum in May or June.

TABLE V.—Showing month by month the number of houses invaded by Enteric Fever, in the Urban District of Stockton-on-Tees, in 1895, and the total number of Cases and Deaths therefrom.

	ENTERIC FEVER.		
	Houses invaded.	Cases.	Deaths.
January	9	9	1
February	7	7	2
March	4	4	1
April	2	2	2
May	4	4	...
June	1	1	...
July	4	7	...
August	7	9	2
September	32	35	3
October	61	70	5
November	27	27	4
December	10	12	1
	168	187	21

The next TABLE (VI) shows the Incidence, as to Age and Sex, of Enteric Fever Attacks, in Stockton-on-Tees, during the year 1895; and shows, also, the Age-period and Sex of Fatal Cases within the same period.

	CASES.			DEATHS.		
	Males.	Females	Total.	Males.	Females	Total.
Under 5 years .	14	6	20	...	...	..
5 to 10 years ...	22	12	34	2	1	3
10 to 15 years ..	11	21	32	...	2	2
15 to 25 years ...	39	20	59	6	4	10
25 to 40 years ...	16	8	24	2	2	4
40 to 60 years ...	9	8	17	1	...	1
60 and upwards ...	...	1	1	...	1	1
	111	76	187	11	10	21

In the next Table (VII) is given a comparison of the Incidence of Enteric Fever during the year 1895, in proportion to the Estimated Population, in each of the ten Wards.

Diagramatic Chart showing the Weekly Rise and Fall throughout the year 1895, in the Number of Cases of ENTERIC FEVER.

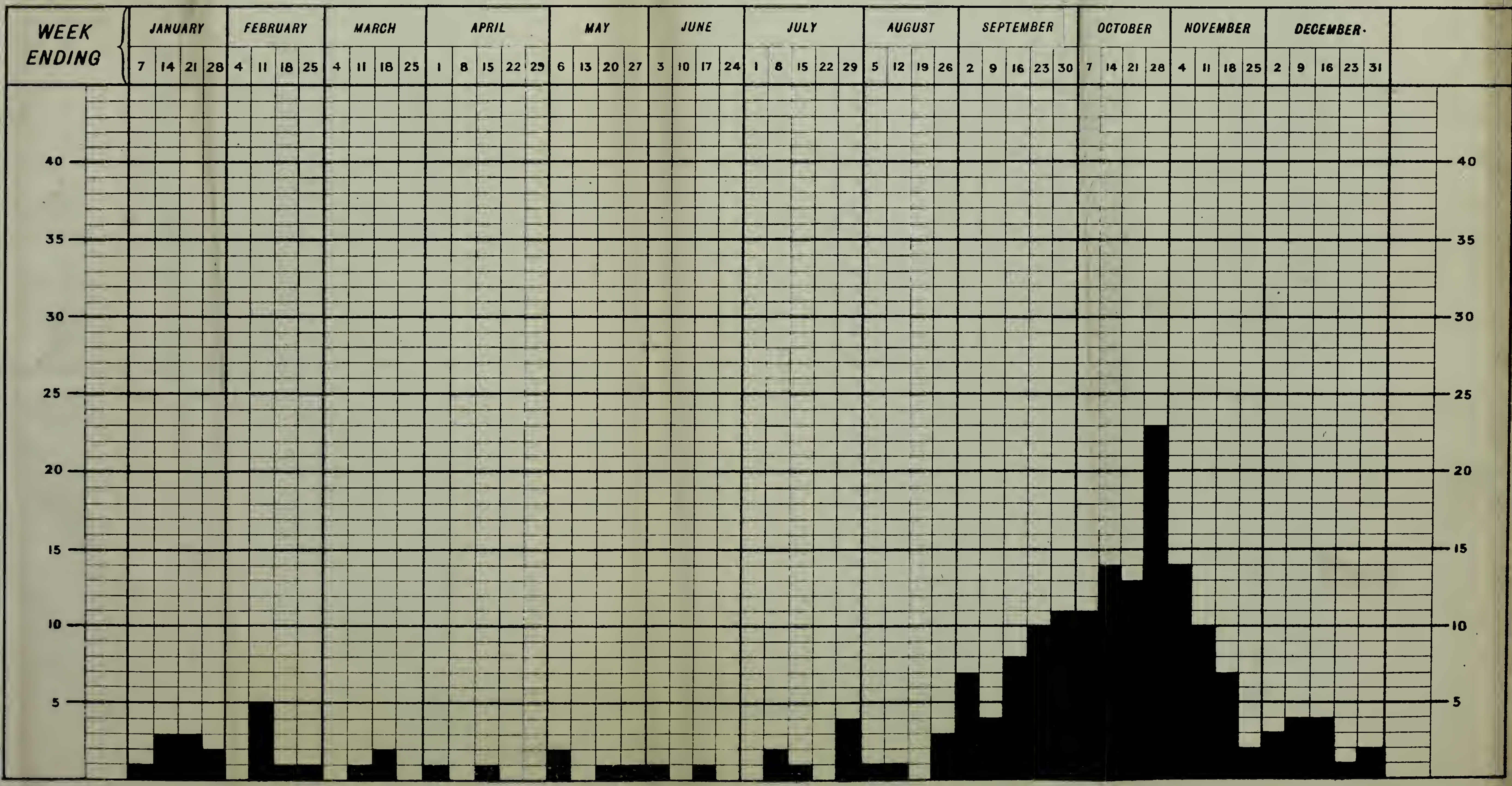


Table VII.—Showing, for the year 1895, Rates of Enteric Fever Attack and Death, per 1000 of Estimated Population, and also the percentage of Deaths to Attacks of Fever in each of the ten Wards.

Ward.	ENTERIC FEVER.					
	Estimated Population, 1895.	Cases.	Rate of Attack per 1000 of Estimated Population.	Registered* Deaths.	Death Rate per 1000 of Estimated Population.	Deaths per cent. of Attack.
Portrack ...	4720	8	1·69	...	...	...
Tilery ...	4385	27	6·15	4	·91	14·8
Victoria ...	6097	19	3·11	1	·16	5·26
South-East	5755	14	2·43	2	·34	14·28
North-West	4795	14	2·91	1	·20	7·14
Central ..	7081	21	2·96	3	·42	14·28
Exchange ..	4430	8	1·80	...	...	...
West-End ...	6766	47	6·94	7	1·03	14·68
Parkfield ...	4595	9	1·95	2	·41	22·2
South-West	5370	20	3·72	1	·18	5·0
	53994	187	3·46	21	·38	11·2

* Deaths which occurred in Hospital are apportioned to the Wards from which the cases were removed.

Although cases of the disease occurred in every Ward, the incidence of attack varied considerably in different localities. A greater number of cases occurred in the West-End than in any other Ward, and not only was the actual number in this Ward greater than in any other, but the percentage of cases relative to the estimated population was higher. The Tilery Ward, however, sustained an almost equal incidence of attack. The Portrack, Exchange, and Parkfield were the only Wards in which the number of cases did not reach two figures. These points are shown in Table VII.

What has gone before not only conclusively proves that enteric fever was either endemic or epidemic in the Borough prior to the year 1895, but it also shows equally clearly that the disease was by no means a rarity during the earlier part of that year. Under these circumstances it cannot be expected that attempt should be made to discover the origin of the disease in the district, or to trace its progression from that beginning. Such a task would be utterly impossible of execution, seeing that the time when the district was absolutely free from the disease is lost in obscurity, and seeing, too, that the avenues of diffusion are so numerous and subtile. What can be done, however, and done with possible advantage, is to consider the local conditions which may have favoured not only maintenance of enteric fever, but also its diffusion in epidemic form. With this intent I propose to discuss briefly in turn each of the following possible agencies by which enteric fever is spread :—

1.—Spread of the disease through impure water.

2.—Influence of poisoned emanations from sewers, privy middens, foul gulleys and the like in disseminating the disease.

3.—Milk as a channel of infection.

1.—*Spread of the disease through impure water.*

The whole of the houses in which the disease occurred are supplied with water from the Stockton and Middlesbrough Corporations Water Board's Works.

A few persons were inclined to blame the water as the medium by which the fever was spread, but no evidence came to my knowledge to support that view, and considering the question now I consider the hypothesis is unsupported.

Had the water been the channel of infection, the epidemic would have been more equally divided throughout the district. In the Portrack, Exchange, and Parkfield Wards, however, there were relatively very few cases. Then, again, not a single case occurred in the Workhouse (situated in the Portrack Ward), in which usually more than 300 persons dwell, and which has its supply from the Water Board's works. The fact that two cases were reported in the Surgical Hospital (situated in the South-west Ward) which, on an average, has 60 inmates, might, at first sight, seem not antagonistic to the possibility of the "town" water supply being at fault, but inquiry into the circumstances connected with the cases proved conclusively that the particular water delivered to the Surgical Hospital, at any rate ("town" water), was not answerable. The first case occurring in the Hospital was notified on the day of the patient's admission, so that the disease could not have been contracted in the Institution, and the second occurred in the person of the nurse who nursed, and, doubtlessly, caught infection from the first case. Further argument against the view that water conveyed infection is to be found in the fact that other areas, having the same source of water supply as Stockton, were not equally invaded by the disease. And, lastly, the behaviour of the epidemic did not conform to one produced by infected water.

2.—Influence of poisoned emanations from sewers, privy middens, foul gulleys and the like, in disseminating the disease.

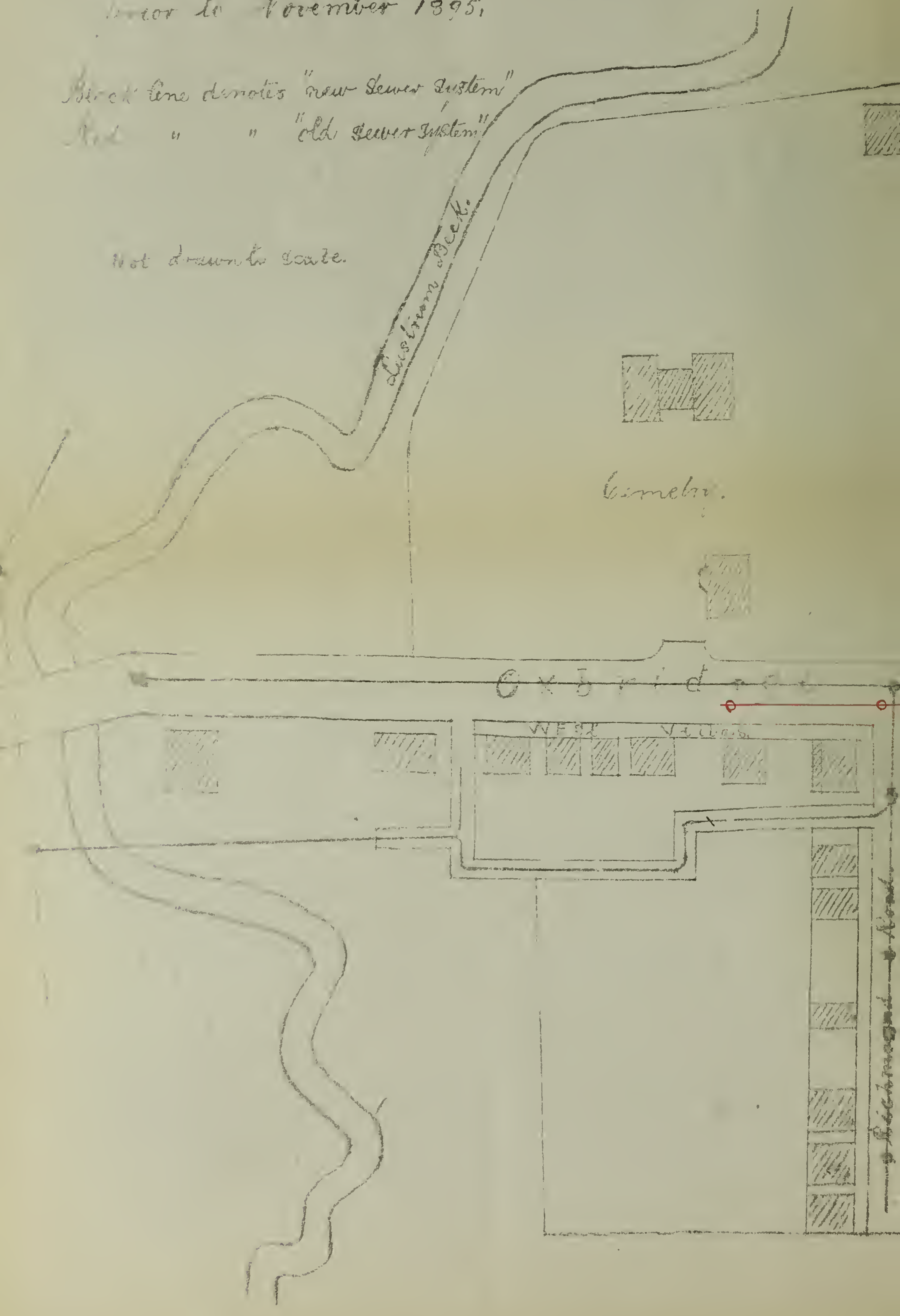
It is a very common belief among residents in and about Richmond Road, and a belief largely accepted by a considerable section of the public, that enteric fever was spread in that locality by the emanation of gas from sewers.

Before attempting to discuss what foundation in fact (if any) this belief has, it is necessary to describe shortly the sewerage of the district lying on both sides of Oxbridge Lane between the Railway Subway and Oxbridge. There is a new main sewer in Oxbridge Lane. Commencing near the Railway Subway it passes along Oxbridge Lane in a westerly direction until it joins the intercepting sewer already described. This new sewer was constructed in 1892 to replace an old one, which is for a part of its length of pipes, and for the other and larger part of brick. This old sewer begins near the brow of the Cemetery Hill, and passes in an easterly direction along Oxbridge Lane and Yarm Road to Castlegate, down which it proceeds to discharge into the river. As stated in my fortnightly report, dated November 17th, 1895, the details regarding the various sewers of the Oxbridge Lane district and their connexions were not at that time forthcoming. I have since obtained from the Borough Surveyor a list of the sewers that were at the time referred to in connexion with the new main sewer, and a list of those that communicated with the old sewer.

Sewers in the following streets had connexion with the new sewer, viz.:—Back West Villas, Richmond Road, Suffolk Street, Back Suffolk Street, Back Rutland Terrace, Childray Street, Sheraton Street, Light Pipe Hall Road, Back Carr Street, Back Light Pipe Hall Road and Sheraton Street, Back Sheraton and Wren Street, Wren Street, Back Wren and Elsdon Street, Back Tyndale Terrace.

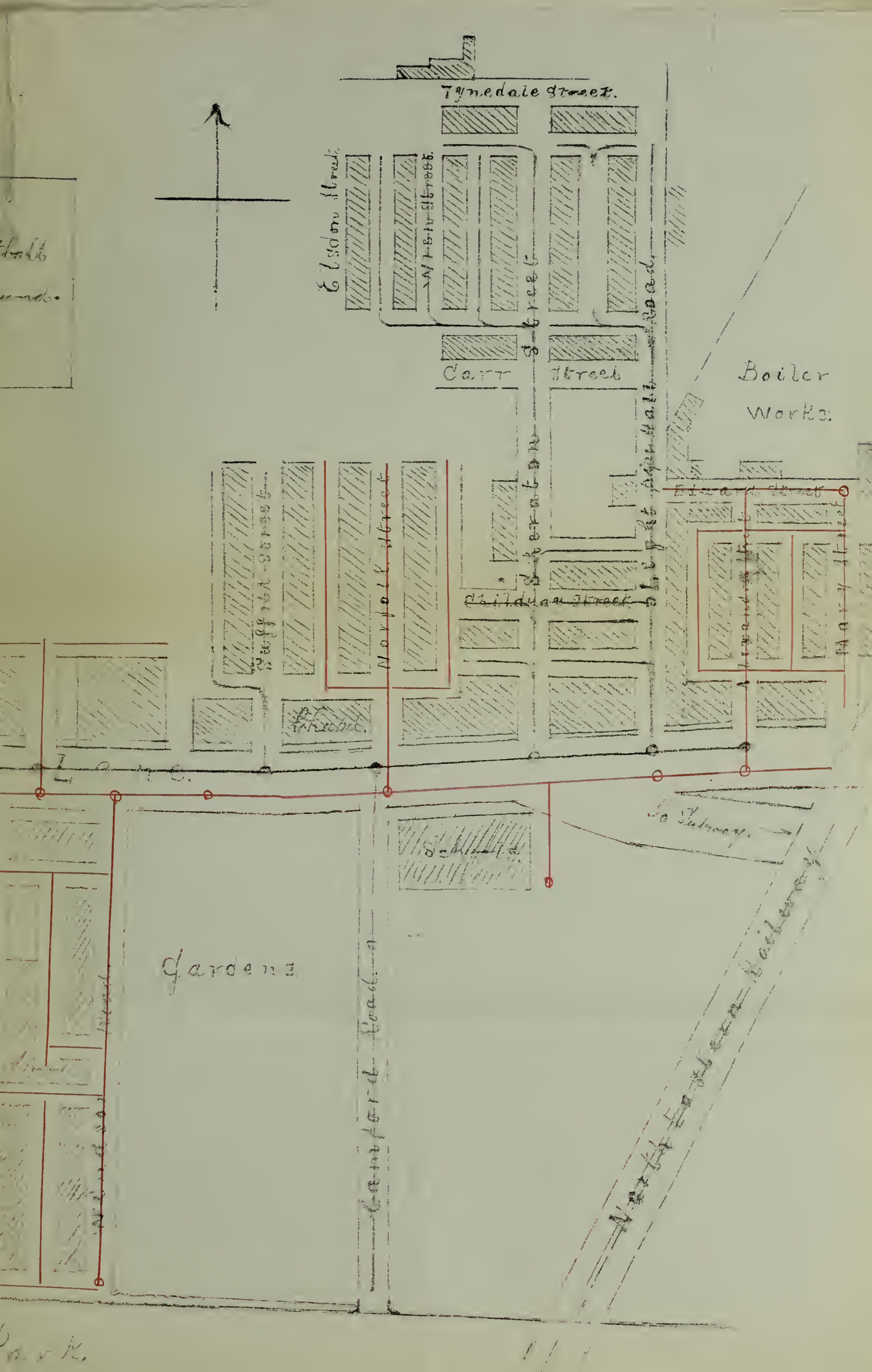
The sewers in the following streets had communication with the old main sewer, viz.:—Hampton Road, Back Hampton and Richmond Road, Windsor Road, Back Hampton and Windsor Road, Back Ashfield Terrace, Norfolk Street, Back Norfolk and Suffolk Street, Alexandra Street, Back Light Pipe Hall Road and Alexandra Street, Mary Street, Back Mary and Alexandra Street, and Edwards Street. With respect to the houses in Richmond Road, it is to be noted that the drains of the 17 on the east side pass into the back street, and were therefore in communication with the old sewer, while the drains of the 10 on the west side enter the Richmond Road sewer, and were therefore in communication with the new sewer. See plan annexed.

Plan showing the arrangement of Sewers
which existed in the "defined area"
prior to November 1895.



Black line denotes "new Sewer System"
Red " " "old Sewer System"

Not drawn to scale.


Tynedale Street.
Elsdon Street.
Carr Street
Boiler Works.
Childuan Street
Suffolk Street
Norfolk Street
School.
Lane
To Subway.
School.
Gardens
North Eastern Railway
Park.

By referring to the notification returns of enteric fever during the 3 months immediately preceding the chief incidence of fever in the area with which I am now particularly dealing (and which coincides with those portions of the West-end and South-west Wards lying to the west of the North-Eastern Railway) it is seen that facilities existed for the contamination, of both the sets of sewers just described, with the specific poison of enteric fever from current cases of the disease.

In the case of water closeted houses invaded by enteric fever, the specific contagion would be supplied by excreta directly through the soil pipes. In non-closeted houses it might be conveyed in the washings from the soiled linen of the patients, or possibly by their bowel discharges (especially young children's) finding access to yard gulleys before "typhoid pans" had been supplied, or again by the washings from the back streets after the visits of the night scavengers.

During June no case was reported in the defined area. In July there were four cases in one house in Wren Street (new sewer system), in August a case occurred in Norfolk Street (old sewer system), in September three fresh cases in the same house in Norfolk Street, and one case on the east side of Richmond Road (old sewer system). During the following month (October) 17 cases occurred in streets the sewers of which had communication with the new sewer system, and five in houses whose drains were in communication with the old sewer. Four of these latter, however, were in houses on the east side of Richmond Road, and they were notified as follows:—One on October 22nd, another on October 23rd, and two on October 27th. Two of the 17 cases in streets on the new sewer system reported in October were on the west side of Richmond Road, and were notified on October 22nd and October 23rd respectively. It is important to note here that on October 7th and October 8th the Richmond Road sewer was opened for the purpose of connecting two ventilating lamp columns with it, and I was informed by residents in the street that they had experienced obnoxious smells which they believed proceeded from the openings made in the sewer for the purpose named. One child who was attacked with enteric fever is said to have stood for some time watching the men working at the sewer, and its illness was thought to have been contracted in that way.

In November the number of cases notified having relation by their situation to the new and old sewers was seven and four respectively. No further case occurred in the defined area during the remainder of the year.

Thus it appears that between the beginning of July and the end of November 28 cases of enteric fever occurred in dwellings whose drains had communication with the new main sewer in Oxbridge Lane, while only half that number occurred in houses which were by their drains connected with the old sewer, and of these latter no less than 5 were in houses on the east side of Richmond Road; *i.e.*, in houses which although not connected by their drains with the new sewer, were exposed to any emanations which may have proceeded from the Richmond Road branch.

It is necessary now to treat of certain detail matters which may have direct bearing upon the question under consideration. So far as I can learn it appears that public attention was forcibly drawn to defects in the condition of the new sewer in Oxbridge Lane, and to the sewer in Richmond Road in the summer of 1893 by nuisance caused by bad smells which were said to proceed from open grids which then covered the sewer openings, and which had been provided for purpose of ventilation. In consequence of complaints the open gratings were carefully closed, and a certain number of pipe shafts (mainly of the sort animadverted upon in another part of this report) and ventilating lamp columns were substituted. Although complaints were after this less frequent, they did not cease altogether, and during last summer they became as loud as they had been two years before.

To these smells the illness of several persons was directly ascribed, and so notorious has Richmond Road become by the reputed liability of its inhabitants to sickness, that it is literally shunned by not a few people, although by reason of its open situation it should be a favourite residential locality. In order that as many details as possible regarding the sewers in question may be remembered in concrete form, I here quote from my report of 7th November, 1895, and from the Borough Engineer's report of 22nd of the same month :—

"The Richmond Road Sewer is constructed of glazed earthenware pipes 12 inches in diameter. It is 983 feet in length, and extends in a straight line from a blind end at the south extremity of Richmond Road to Oxbridge Lane, where it joins the new main sewer (which runs in a westerly direction) in an inspection chamber. In its course it has nine flushing shafts and three inspection chambers. One of the latter is near its blind end, another is about its centre, and the other is some 20 yards or so from Oxbridge Lane. The Borough Engineer informs me the sewer has a gradient of 1 in 172, except at the end where it joins the main sewer and where the gradient is much greater. The sewer receives the surface water of the street, and the drainage from 10 houses. The provision for its ventilation consists of three quadrilateral iron shafts, each 6 inches by 4 inches, which are carried up buildings, and of two ventilating street lamp columns. Each quadrilateral shaft reaches the building to which it is attached by a more or less horizontal arm, and then ascends vertically. The inspection chambers, which until lately were covered with open gratings, are now covered by close fitting lids. On flushing the sewer from the eye at its south extremity, and timing the flow, it was found that the flush reached the junction with the Oxbridge Lane sewer in 5¼ minutes. This rate is equal to a velocity of 3·1 feet per second. At the time of the flushing I noticed, momentarily, a whiff of gas of an unpleasant odour escape from the northernmost manhole. So far as could be ascertained at the inspection chambers the condition of the sewer appeared to be satisfactory, except that it was noticed that, after the main body of the flush had passed, sewage did not flow through the invert in the northernmost manhole as well as I thought it should. During the flow of the flush the depth of liquid in the invert was 2¾ inches. Looking to these facts it appears to me the following imperfections appertain to the sewer :—1st.—Too large a capacity in relation to the amount of sewage passing through it. 2nd.—Insufficient ventilation. 3rd.—Localised sluggishness or stagnation (as observed at a time when a minimum quantity of sewage was entering) which might possibly be due to an accidental and transient cause ; and 4th.—Absence of provision for adequate flushing.

In considering the question of a possible causative relation of the condition of the sewers with prevalence of fever in the particular locality, it soon becomes evident that attention must be paid to a wider area than one street.

That grave nuisance in the form of an obnoxious stench, which is said to have arisen from the sewer in Richmond Road, has been pretty constant, cannot, I think, be gainsaid. The testimony of almost everyone who has had occasion to frequent the street leaves no room for doubt on this point. But inquiry reveals the fact, also, that up to a certain date complaints were common of a similar nuisance, which was said to arise through the open gratings which at that time covered the manholes in connection with the new main sewer in Oxbridge Lane. Since close lids were substituted for open gratings in that position there has been much less complaint of nuisance in Oxbridge Lane, but it is a question whether the change may have only obscured the conditions which were productive of the nuisance without removing the cause. It is not impossible either that the nuisance in Richmond Road may have been produced by very similar conditions to those which were causative of the nuisance in Oxbridge Lane. It is possible, also, that the nuisances in the two localities may have had a common origin, and, moreover, there is even another contingency not too remote to be thought of, viz., that the closing of the open gratings in Oxbridge Lane may have tended to accentuate the nuisance in Richmond Road. Taking the district then which abuts onto Oxbridge Lane on both its north and south sides, and which extends from the Subway under the Railway to the Cemetery, it is seen that fever has invaded certain streets while others have so far remained free. The question arises, therefore, whether the distribution of fever cases in this area indicates relation to any special sewer or set of sewers in the locality. On the various points raised I cannot as yet offer any opinion. The necessary data with regard to the connections and levels of the various sewers in the area referred to are not at present at hand. The Borough Engineer is making investigation into various points about which he is not able at present to speak with absolute certainty, and he will, I believe, present a report on the subject at the next meeting of the Council."

The Borough Engineer reported on the subject as follows :—

"In response to complaints received from time to time relative to the sanitary condition of Richmond Road and neighbourhood special efforts have been made in order to arrive at a correct estimate, in the first instance, of the extent of the alleged nuisance, and further, to ascertain some tangible cause in support of the statements made with regard to it. On the 20th February last I commenced to take daily observations, under conditions favourable to the detection of offensive smells, duly recording the time and the result obtained, and continuing these observations until the 18th April (practically two months). From an analysis of the summary of these observations the results produced are not by any means more unfavourable than what would reasonably be expected from a sewer working under similar conditions. The Richmond Road sewer was constructed in 1880, and may therefore be classed of modern type. It is formed of salt glazed circular earthenware pipes, 12 inches diameter, and extends for a distance of 328 yards to its confluence with the new sewer in Oxbridge Lane, to which it is connected in the most approved method. The sewer has been laid at a true gradient of 1 in 172, and provides for a velocity of 3 feet per second when running one quarter full. Previous to 1893 it was ventilated by 3 manhole openings, 12½ inches in diameter, and 7 box cover openings, 6 inches in diameter, all of which discharged at the crown of the roadway. During operations in connection with private improvements, executed in 1893, two additional 6-inch shafts were fixed between the sewer and the crown of the road, and at a later period three 6-inch by 4-inch ventilating shafts placed against the buildings in approved situations, also two 6-inch lamp column ventilators fixed in the footpath, the latter being substituted in place of shafts where the property owners declined to have them fixed against their buildings. Concurrently with this additional ventilation the 3 manhole covers above mentioned were sealed. From the above facts it will be seen that Richmond Road sewer is provided with means of ventilation at every 70 feet of its length, and that when working under the required head or a given discharge, in proportion to its capacity, the sewer must be regarded as satisfactory. Irrespective of the latter conditions, influences such as are made the subject of complaint may to some extent be established, and on that assumption I would respectfully direct your attention to the following observations :—

The capacity of the Richmond Road sewer is sufficient for a volume of 1134 gallons per minute. Taking the present population of the 10 houses using it to number 50 persons the discharge would not exceed 1·04 gallons per minute, a proportion altogether inadequate to provide for that velocity of transit which would prevent matters liable to decomposition to be conveyed at such a speed as would prevent decomposition and the escape of noxious gases. Further, it is to be observed that for 8 hours out of the 24 the sewer has practically no discharge whatever, and as it stands at an altitude of 54·60 feet above the new intercepting sewer it must be noted that it simply acts as an ordinary chimney shaft, especially where the fall is great and no uniform rate of flow to prevent gases from the lower points of the system of sewage escaping at the highest poinst.

> According to the law of the diffusion of gases the rate of diffusion is inversely proportional to the square root of its density. It is difficult to treat in so short a space as is usually allotted to the District Council Reports all the principal points bearing upon this subject. I will therefore only suggest what appears to me necessary in order to obviate the evils arising from the transference and accumulation of gas in the higher portion of a sewered district. The mode usually adopted is to break the fall so that each sewer only ventilates its own length. Lightly balanced valves, by Messrs. Stone and Co., are adapted for this purpose. In addition, a well devised system of flushing equal to the discharge capacity of the sewer is necessary, although theoretically a better velocity is provided under certain conditions when running two-thirds full than when running full, the former however has the advantage of removing any germs that may find location under the arch of the sewer. In making a general sanitary survey of the district lying to the west of the Railway I have specially tested the velocity of the new sewer in Oxbridge Lane, and find it maintains a steady flow at the rate of 3 feet per second and is working most satisfactorily. Continuing my observations to the north and east end of the Light Pipe Hall Estate I found it necessary, in the absence of inspection shafts, to open out certain sections of old sewers in order to ascertain their condition, but as what I have already stated appears to cover the ground submitted to me it may not be necessary to consider them in detail in this Report."

As a consequence of the closing of the roadway grids, to which repeated reference has been made, it appears probable that sewer air is, under certain meteorological conditions, forced through imperfectly sealed street gulleys. The same thing very likely happens, more readily perhaps, at yard gulleys, which are too often found to be imperfectly fixed. Many of the latter are placed underneath or not far from pantry and other windows, so that it is not unlikely that fever germs may have been respired with sewer air, or have been swallowed with food that has become specifically infected through these channels. On one occasion during dry weather I myself noticed a nuisance caused, I believe, by the escape of sewer air from the street gulley in the Oxbridge Subway, due I presumed to unsealing of the trap by evaporation. The commencement of the new Oxbridge Lane sewer and the blind end of the Richmond Road sewer are among the highest points of the local sewer system, and this may explain the frequency of sewer emanations in those quarters, as the tendency is for air in sewers to pass in an inverse direction to the flow of sewage, and therefore from the lower to the higher portions.

While discussing the problems embraced by the second heading of my proposition, I have hitherto referred to sewers of a certain defined area only, for the following reasons:—The particular area is the one that sustained the greatest incidence of attack of enteric fever, and at the same time it is the locality (among those severely invaded) about which most is known in regard to its sewer arrangements. Complete details concerning sewers in the Tilery Ward are not forthcoming at present, and it is therefore impossible to consider the distribution of enteric fever in that district with respect to any possible relation it may have had to sewerage, with any likelihood of advantage. It is, however, not to be forgotten, whatever the precise arrangement of the sewers in this locality may be, that all communicate more or less directly with the intercepting sewer, at points in its course beyond where the Oxbridge Lane sewer joins it. Moreover, it is not unlikely that sewage reaching the Tilery main may have had specificity imparted to it from another source which is now controlled. It is possible, I think, therefore, that sewage flowing through the intercepting sewer in the Tilery district may have given off infective gases, and that these may have gained access to dwellings and acted generally in a similar way to what has already been suggested.

Occasional flushing of sewers is done by discharging the contents from a water cart through a hose down manholes or flushing eyes. It is obvious that the volume of water discharged from say a 4-inch nozzle cannot effectually flush a sewer of three or more times its size. It appears, therefore, that the process of flushing adopted must be regarded as unsatisfactory, both in respect to regularity and method. I would say then, in conclusion, with reference to the possible relation which sewer and drain defects of the sort mentioned have had to dissemination of fever, that circumstances are strongly suggestive that specifically infected sewer air was a not inconsiderable factor, especially in the locality with which I have dealt.

The influence of emanations derived from privies in the maintenance and spread of fevers should, in my opinion, be estimated with conspicuous liberality as regards potency, and with still greater freedom when extent of distribution is considered. That numbers of privy middens in every section of the district become from time to time specifically infected with the poison of enteric fever must be admitted, and as stated elsewhere I regard their effectual disinfection under such circumstances as practically impossible. It requires no inspection to reveal (especially during the warm weather of summer and autumn) sickening stenches arising from these pest breeders. Sufficient may be observed by wayfarers along almost every back street in the town to indicate the existence of such stenches, and how seldom or how often they are imbued with specific contagion it is impossible to say. Certain it is, however, that even if not themselves specifically contaminated, these odours when encountered lower vitality, and thus increase the receptivity of individuals to germ disease. The proximity of numbers of privies to the doors and windows of houses unmistakably favours the passage of infective dust into dwellings; indeed, especially during hot and dry weather, wafting of filth dust into pantries, or even into the mouths of individuals, must be of no infrequent occurrence. In some such manner as here indicated enteric fever has, in my opinion, been largely nurtured in and diffused throughout your district.

Milk as a channel of Infection.

From the first week in July a vigilant watch was kept upon the information elicited in course of such inquiry as is invariably made into the circumstances attending each case of enteric fever. Nothing presented to lead me to connect diffusion of fever with milk supply prior to October 8th. On that day two young men, W. Y. and T. H., living in adjoining streets, were reported as suffering from this disease. W. Y. had, up to October 3rd, been engaged at a dairy farm quite near to his home, and T. H. had regularly drank milk obtained from the same farm. Notification records showed that a case of enteric fever had occurred in W. Y.'s family in the previous May, and 4 other cases of the same disease had occurred in the household during July. Up to 3rd October W. Y. had lived at the farm at which he was employed, but on that day he was obliged to give up work, on account of illness, and go home. His home was, as I have said, quite near (perhaps 50 yards distant) to the farm. No other illness, so far as could be ascertained, had occurred at the farm, and the cows, it was stated, had been during the whole year free from all suspicion of unhealthiness. Learning that W. Y. had been in the habit of calling always once, and generally twice daily, at his home, usually when he was on his round delivering milk, it appeared highly probable he had contracted his illness there. The account his mother gave me of the onset of his illness was graphic, and at the same time lamentable, as showing how very imperfectly the danger of exposing milk to the risk of infection is realised. After premising that W. Y. had complained slightly for a day or two previously, she said that on 3rd October, when he called at his home, "he set his can down there" (pointing to a spot near the fireside) "and said—Oh, dear mother, I do feel so bad." Here, then, was unmistakable evidence that W. Y. (who had been engaged in milking cows, in assisting generally in the work of the dairy, and in delivering the milk) must have been suffering with enteric fever at the time he was following his regular employment. Moreover, it seemed highly probable that W. Y.'s visits to his home had afforded opportunity for infection of the milk contained in his milk pail at the time of these visits.

T. H.'s illness, which was notified on the same day as W. Y.'s, came on in an insidious manner, and the exact date of its onset could not be fixed. Certain it is, however, that the onset was within a period which rendered it feasible to entertain the idea that his attack might be due to milk infected by W. Y. On the other hand, finding that milk from the dairy in question was supplied to a large number of houses, it was thought quite possible that the attacks of W. Y. and T. H. were merely coincident in point of time of notification, and had no relation to each other; judgment on this point was therefore suspended. Meanwhile, precautions were taken against continuity of infection through the agency of milk, if infection by that means had existed, by insisting on the thorough disinfection and cleansing of utensils, &c. Between the 8th and 19th October, five more cases of enteric fever were reported in the area to which the milk supply under consideration was (with the exception of one house in the South-East Ward*) limited, four of them being in houses having their milk supply from the dairy referred to.

These lent support to the suspicion that the milk supply in question might be implicated. I therefore made written application, dated 19th October, to the proprietor of the dairy for a list of his customers, so that my suspicion might be supported or removed. This application met with no response, and repeated personal requests met with no better result. It became necessary, consequently, to advise the District Council, at their meeting of 25th October, to require the milk purveyor in question to furnish, within 24 hours, a list of his customers, agreeable to Section 92 of the Stockton-on-Tees Extension Act, 1889. This advice was followed, except that 48 instead of 24 hours were allowed. The information obtained enabled me to express an opinion, at the following meeting of the Council, in the following terms:—

> "Respecting the suspicion which I was, unfortunately, obliged to divulge, that a certain milk supply might have become implicated in the spread of fever, it is right to state that the information obtained since the last meeting of the Council certainly falls far short of establishing a causal relation between it and cases of fever generally. Nevertheless, it is impossible to overlook or disregard facts that lend support to the suspicion that in certain cases the disease may have been contracted through milk agency. If such was the case, however, it appears highly probable now that the implication was transient."

A survey of the evidence bearing upon the question of diffusion of enteric fever generally by milk supply throughout the district, may now be taken with advantage.

There are, altogether, 305 persons registered as sellers of milk in the Borough, but only 56 of these supplied milk to any of the houses that were invaded by enteric fever between 1st July and 31st December. Information obtained shows that, in many instances, different particular milk vendors among these 56, supplied milk to only a single household that was invaded by enteric fever, others supplied two invaded houses and so on. Only in one isolated instance did a purveyor supply milk to a larger number than six invaded houses. In 14 of the households invaded by enteric fever condensed milk only was used, and in three other such houses no milk of any kind was taken. Seeing that the number of houses invaded in the above period was 126, it is apparent that the milk supply was greatly sub-divided; so much was this the case that if the houses where condensed milk or none at all was used are omitted, the figures yield an average of just under two invaded houses to each of the 56 milk vendors. It is evident therefore, I think, that as a carrier of enteric fever throughout the district generally, milk may be disregarded.

It remains now to consider whether evidence supports or negatives the suspicion entertained regarding the implication of the particular milk supply to which I have already referred in the diffusion of enteric fever. An important fact in connection with this question is, that this suspected milk supply was identical with that of the purveyor who supplied more than six invaded houses. The supply was limited (with the exception of the single house in the South-East Ward already referred to) to houses situate in the West-End and South-West Wards.

The number of houses regularly supplied with milk from this suspected source was 116, and of these no less than 28 were invaded by enteric fever between July and December, 1895. The invasion rate was therefore 24·1 per cent. In order to compare this incidence of fever with that which affected other houses situated in the same Wards, having other sources of milk supply, I have obtained lists of the houses supplied by each of six other purveyors of milk who, it is believed, supply a larger number of houses in these Wards than any others, and have tabulated the results respecting the seven milk services in the following Table, using a letter of the alphabet as a distinguishing designation for each:—

---

*A case of enteric fever was notified in this house on October 29th.

Table VIII.—Showing the House Invasions in each of the seven chief milk services, in the West-End and South-West Wards (July to December, 1895), and the Percentage of Houses Invaded in each of these milk services.

Designation of Milk Seller.	Number of Houses in West-End and South-West Wards supplied.	Number of Houses in service Invaded by Enteric Fever, July 1st to Dec. 31st.	Percentage of Invasions to Houses supplied.
A	124	...	...
B	116	28	24·1
C	92	...	...
D	74	2	2·7
E	70	1	1·4
F	65	1	1·5
G	57	1	1·7

I have also prepared the following Table (IX) which indicates the *possible* extent to which each known source of milk supply to invaded houses *could* have had causal relation with invaded houses or cases.

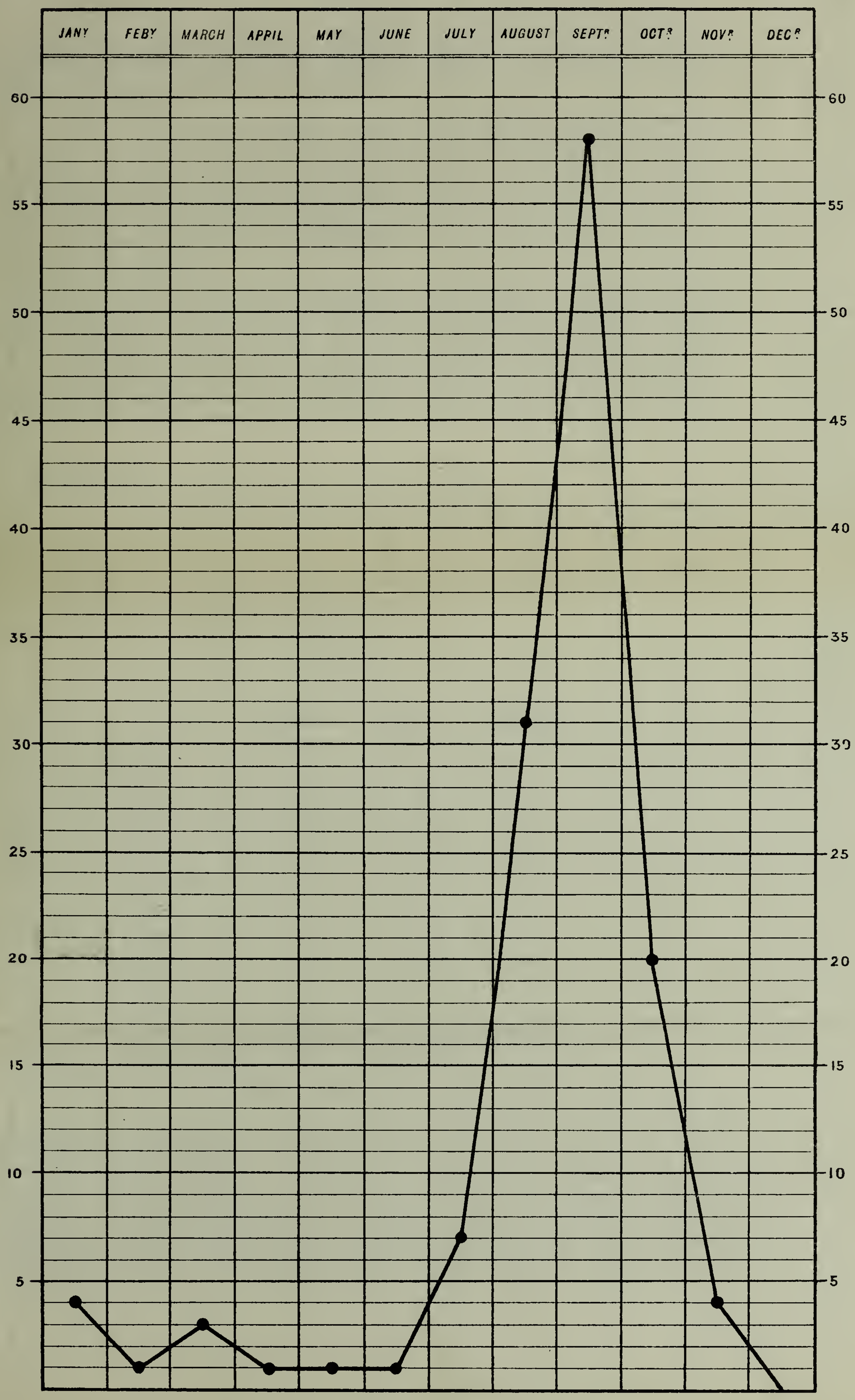
Table IX.—Showing the Number of Houses invaded by Enteric Fever, and the Number of Cases of that disease in the West-End and South-West Wards, and the Percentage of the total of such that were supplied by each and every Milk Seller in whose service, within that area, there was any invaded house during the period, July to December, 1895, adhering to the same designation for each of those Milk Sellers included in Table VIII and in this Table, and using additional alphabetical letters for the others.

Total Number of Invaded Houses in defined area.	Total Number of Cases in defined area.	Designation of Milk Seller or Source.	Number of Invaded Houses in Milk Service in defined area.	Number of Cases in Milk Service in defined area.	Percentage of Invaded Houses to Total of such in defined area.	Percentage of Cases to Total Number in defined area.
44	60	B	28	37	63·6	61·6
		D	1	1	2·2	1·6
		E	1	1	2·2	1·6
		F	1	1	2·2	1·6
		G *	1·5	1·5	3·4	2·5
		H	1	1	2·2	1·6
		I	1	2	2·2	3·3
		K	1	1	2·2	1·6
		L	1	1	2·2	1·6
		M	1	1	2·2	1·6
		N †	1·5	2	3·4	3·3
		O †	0·5	2	1·1	3·3
		P	1	1	2·2	1·6
		Q		1		1·6
		R	1	1	2·2	1·6
		Condensed.*	0·5	0·5	1·1	0·8
		No milk.	1	1	2·2	1·6
		Promiscuous.	1	4	2·2	6·6

* One house was supplied by G exclusively—in another house G's and condensed milk were both used.

† One house was supplied by N exclusively, and another was supplied by N and O jointly.

Chart showing Month by Month the Number of Deaths from DIARRHŒA in Stockton-on-Tees, during the year 1895.



Consideration of the data set forth leads me to conclude that it can hardly be disputed that B's milk service was a channel by which the infection of enteric fever was conveyed, although it is impossible to indicate with accuracy the extent to which it so acted.

More than one interesting problem, raised by the assumption that implication of this source of milk supply occurred, will, I fear, in any case remain unsolved. For instance—What was the precise mode by which the milk became infected? Was it through W. Y. handling the cow's teats, or the milk vessels, or did it result from the entrance into the milk contained in his pail, at the time of his visits to his home, of germs floating in the atmosphere of the house, or by both, or by neither of these methods?

Further, on the answer to these questions would depend, to some extent, the solution to the following proposition:—Did the bulk, or only a limited portion, of the milk produced at the particular dairy on any particular occasion, become infected? Something might, perhaps, have been done to find correct replies to these queries if those who were able had given information willingly when asked; instead of doing so, however, they furnished details with the greatest reluctance, and in such a way that what was stated had to be accepted with the greatest caution.

Diarrhœa.—To this disease 131 deaths have to be attributed, or nearly 13 per cent. of the total deaths at all ages from all causes.

No less than 126 were of children under five years of age. The annexed Diagram shows the epidemic character assumed by the disease in the summer and autumn months.

The next Table (X) shows the number of Deaths from Diarrhœa, which occurred in 1895, in each of the ten Wards, and the Diarrhœal Death Rate.

TABLE X.

DIARRHŒA.

WARD.	Estimated Population.	Registered * Deaths.	Death Rate per 1000 of Estimated Population.
Portrack ..	4720	15	3·17
Tilery	4385	15 [2]	3·44
Victoria	6097	14 [1]	2·29
South-East ...	5755	7	1·21
North-West ...	4795	13 [4]	2·27
Central	7081	12 [2]	1·69
Exchange ...	4430	9 [2]	2·03
West-End ...	6766	25 [6]	3·69
Parkfield ...	4595	12 [5]	2·61
South-West ...	5370	9 [2]	1·67
	53994	131 [24]	2·4

* The figures in brackets in this column denote deaths certified from Gastro-enteritis and Gastro Enteric Catarrh, which are included in the deaths from Diarrhœa.

It is well to remind the Council that epidemic diarrhœa is eminently a preventable disease. Speaking in broad terms, it may be said that had the 131 children, who died of this disease in Stockton last year, lived under rural, instead of under urban conditions, a very large percentage of them would have survived. This statement indicates coarsely the nature of measures which are calculated to prevent epidemicity of the disease. Free ventilation, plentiful sunlight, and comparative freedom from accumulation of filth near to the dwellings, are conditions that prevail in country districts, while they are largely absent in towns. The nearer, therefore, that urban existence can be made to approach rural life the less liability will there be to epidemic diarrhœa. A very great deal can be done—and done with far greater success than is generally recognised—even in towns, to prevent this fatal disease.

Writing on the subject in my report of 30th August last, I stated as follows:—

> “Among these (the causes of diarrhœa) are chiefly:—”
>
> “1.—A previous weakly condition.
>
> 2.—General overcrowding and insanitary surroundings, such as accumulation of filth and dirt in and about the dwellings, want of ventilation, &c.
>
> 3.—Improper food and improper methods of feeding.
>
> Measures calculated to prevent this very fatal infantile disorder consist, therefore, in such as the following:—
>
> 1.—Maintaining as far as possible a general state of good health.
>
> 2.—Taking especial care to ensure a condition of absolute cleanliness in and about the dwelling by the speedy removal of all refuse from its precincts, and by thorough cleaning and free ventilation.
>
> 3.—Adherence, where possible, to the infant's natural food, to the exclusion of all others; where this is impossible, to allow no feeding bottle with a tube to be used. To use only fresh milk, and to always boil it as soon as possible after it enters the house.”

These are truisms which I feel convinced cannot be too often repeated, or too forcibly urged, so long as epidemic “diarrhœa” figures so prominently in mortality returns.

Disinfection.—In my fortnightly report, dated 16th August, 1895, I stated as follows:—

> “Believing, as I do, that undue reliance is placed upon fumigation and upon disinfectants—as commonly used—to rid articles of clothing, bedding, &c., which have been in use by fever patients, of their infective quality, I respectfully invite the Council's attention to the subject. Without entering into details, I may state that such articles as those mentioned can only be disinfected practically, with any approach to certainty, in an apparatus specially constructed for the purpose. Such an apparatus the Council already possess, and if arrangements were made whereby full advantage could be taken of it, great advantage would no doubt follow.”

Consequent upon this advice the Council referred the matter to the Sanitary Committee, and they in turn appointed a Sub Committee to consider it. The Sub Committee met on 20th February, 1896, and bestowed considerable attention to the subject. They resolved, however, to postpone further action, on the understanding that I would discuss the question in my annual report.

“Disinfection” is a word, the significance of which is very imperfectly understood. The generality of people think or imagine it an easy thing to accomplish. For instance, a large section of the public appear under the impression that the use of one or other of the various antiseptics—substances that check the growth of those microbes on which putrefaction depends—effects disinfection. Others imagine that a fairly free use of some substance possessing the power of dissipating, or even of covering unpleasant odours, is an equivalent to disinfection. These beliefs explain the reliance that is popularly placed upon the employment of chloride of lime, disinfecting powder, Condy's fluid, and hosts of other substances that are styled disinfectants, but which have no real title to the name. The fallacy of common ideas regarding the meaning of disinfection is still more apparent in such proceedures as the burning of brown paper, or the pouring of vinegar on to a hot shovel. Such like trivialities do not disinfect in the slightest degree, and, unfortunately, true disinfection is far from being so simple a matter as such measures would imply, especially when it is attempted in a short space of time.

It is necessary, in order to explain what is meant by “disinfection,” to mention that all diseases of an infectious nature are consequent upon the accession of certain living microscopical organisms to an environment favourable to their development and propagation; or, in other words, are dependent upon the vital processes of living particles. When this fact is realised it is easy to render intelligible the true meaning of disinfection. It is the annihilation of the organisms on which the infectious disease depends. Anything short of this is not real disinfection; for unless the vitality of these microphytes is actually destroyed it only needs that they shall fall upon suitable soil to enable them to renew their activity.

For the disinfection of infected rooms and their contents, reliance is at present placed upon fumigation by sulphur, a procedure which, as I have stated, I believe to be very untrustworthy, for more reasons than one. In the first place, it is in practice impossible to prevent enormous leakage of the sulphurous acid gas—which is produced by burning sulphur, and which is the disinfecting agent —from rooms so dealt with, and as a consequence it is rarely, if ever, that the percentage of gas necessary for the destruction of germs is present in all parts of the room long enough to have the desired effect.

In the second place, the slightest covering is found to protect microbes from the action of the fumigant, and thus the germs in the meshes of clothing, to say nothing of those deeply embedded in mattresses, blankets and the like, escape. Moreover, some microbes are able to resist fumigation of the sort described. It can, therefore, be easily understood how very unsatisfactory this method must be.

Undoubtedly, disinfection by steam in a proper apparatus is the only reliable and practical mode of dealing with infected articles of clothing and such like. A most exhaustive report, made to the Medical Officer of the Local Government Board in 1886, by Dr. H. Franklin Parsons, proved this conclusively, and the fact, supported as it is by the experiments of Koch, Klein, and bacterologists generally, is acknowledged by all sanitarians. It seems hardly necessary, however, to dwell on the relative effectiveness of the two methods I have briefly sketched, considering that the superiority of the plan recommended has already been recognised by the Council, as witnessed by their having supplied an apparatus for the purpose to their Fever Hospital.

In view of these facts, I hope the Council will be able to act on my recommendation, and make arrangements whereby full advantage may be taken of the valuable appliance which they possess.

ISOLATION PROVISION.

The excellent Hospital provided by the Council for the isolation of the ordinary infectious diseases was, unfortunately, in constant requirement throughout the year. Scarlet fever, enteric fever, and diphtheria were the diseases admitted, and there can be no question that the isolation thus provided was a powerful means of checking the spread of the infection of all three. To what extent, in this respect the institution acted, it is impossible to say, but that it did so to very considerable extent indeed I am confident. Even on the scarlet fever epidemic (which might, because of its long continuance, be thought to have been altogether uncontrolled) it assuredly exercised great restrictive influence, and it would be easy to give numerous illustrations by way of evidence on this point. It will be sufficient to instance what happened in the case of the Stockton and Thornaby Surgical Hospital. That institution was invaded by scarlet fever on 5 different occasions in the course of the year, and as soon as the nature of the illness was recognised, on each occasion the patient was promptly removed to the Fever Hospital, with the result that no further extension of the disease from these cases followed.

It is probable, however, notwithstanding its obvious utility, that the fullest benefit which might accrue from the possession of an isolation hospital has not yet been realised—especially as regards scarlet fever—for various reasons, most of which have been already mentioned incidentally in sections of this report, headed "Infectious Diseases," "Scarlet Fever," and "Disinfection.".

The spread of enteric fever was likewise, undoubtedly, largely checked by isolation, and in respect to diphtheria, the prompt removal to Hospital of early cases was, I believe, one of the most important measures which has saved, up to now, the district from a widespread outbreak of that fatal disease.

The subjoined Table (XI) shows the number of cases of each of the three different diseases treated in the Hospital, the results, and the case-mortality.

TABLE XI.

Disease	Number of cases admitted in 1895	Number of those included in column 2 discharged cured	Number who died	Case-mortality
Scarlet Fever ...	175	167	8	4·5 per cent.
Enteric Fever ...	57	51	6	10·5 per cent.
Diphtheria... ...	5	4	1	20· per cent.
TOTAL ...	237	222	15	6·3 per cent.

In December, 1895, the Council was reminded of the absence of any provision for the isolation of smallpox. Since that date a Committee, appointed to consider the subject, has instructed the Borough Engineer to prepare a sketch plan and estimate of a proposed Hospital, proposed to be erected on a site about 1½ miles from the town, in the Rural Sanitary District.

VACCINATION.

The following Table (XII), showing the condition of the district as regards the vaccination of its inhabitants, is prepared from returns kindly furnished by Mr. Thomas Salmon, Vaccination Officer.

TABLE XII.—Showing the condition of the district as regards vaccination.

Year	Number of Registered Births	Number of Children who died Unvaccinated	Number of Children Successfully Vaccinated	Number of Children Unvaccinated	Percentage of Children neither Vaccinated nor dead
1891	2259	318	1603	256	11·3
1892	2183	234	1685	144	6·5
1893	2146	216	1787	131	6·1
1894	2019	203	1675	111	5·5
Jan. to June of 1895	975	113	753	56	5·7

These returns reflect great credit on the Vaccination Officer, and inasmuch as they show that a large percentage of the children born in the years specified have been vaccinated, must be considered as satisfactory.

It is with regret, however, I feel constrained to refer to circumstances which discount to a most serious extent the feeling of security against smallpox, which the figures should legitimately engender. These circumstances are:—

1st.—The existence of good reasons for believing that, during several years previous to 1891, vaccination was greatly neglected, and that consequently there must be a considerable population, more or less youthful, now living, which is totally unprotected against smallpox.

2nd.—That although the letter of the law relating to vaccination has been in recent years so fairly complied with, there is no lack of evidence to support the belief that the intention of the law—as interpreted by competent Authorities—has been far less equally regarded. I refer to the practice, which largely prevails among parents, of having their children vaccinated in order to themselves escape the penalties of non-compliance with Acts of Parliament, rather than with the object of protecting their children against smallpox.

This being so, parents select to have the operation performed in a manner that affords comparatively but imperfect protection. It has been proved over and over again, to the satisfaction of an overwhelming majority of those who have devoted attention to the subject, that for a child to acquire complete immunity against smallpox, it needs to receive such insertions of vaccine lymph as will produce at least four separate vesicles, whose *aggregated* area shall be equal to that of a sixpenny piece. As the results of the operation of vaccination fall short of this standard, so the degree of immunity lessens, and so the length of time over which the protected state extends diminishes.

It follows, from what has been said, that each year is (in the absence of re-vaccination) supplying an increasing number of persons prone to contract smallpox if exposed to the infection.

Slaughter-houses.—There are 34 slaughter-houses registered or licensed in the district. The majority are unsatisfactory in one or another way. Many are structurally unfitted for their purpose; some are too small, not a few are much too near dwellings or unhealthy surroundings, and the approach to others is inconvenient. All such defects tend to render these establishments detremental to health. The Inspectors who visit each, at least once in every week, report that the slaughter-houses "have been kept in a fair sanitary condition during the past year." I regret to say I have too frequently observed a want of due observance of the bye-laws, especially in respect to the cleansing of the premises after slaughtering, and to the prompt removal of blood, manure, garbage and filth from the premises. The existing accommodation for slaughtering in the district is inadequate, and I am certain the Council would do well to provide public slaughter-houses. By so doing the multiplication of conditions, undoubtedly prejudical to health, would be avoided; for, if suitably situated, properly constructed, and efficiently managed, a slaughter-house can neither give offence or be a danger in any way.

Inspection and the prevention of the sale of unsound meat would also be greatly facilitated. As can be well understood, it is practically impossible for the Inspectors to thoroughly supervise the business carried on, as it is at present, in so many out-of-the-way places. Many towns such as, for example, West Hartlepool, Huddersfield, Liverpool, Swansea and others have provided public abattoirs, and practical experience teaches that they are economical as well as conducive to efficiency.

Common Lodging Houses.—There are 35 registered houses of this class. The Inspector reports that, excepting "a few odd ones," they "have been kept in a very fair condition during the past year."

Unsound Food.—During the year the following meat, to which attention was called by the owners, was found to be unfit for food and was destroyed, viz.:—9½ carcasses of beef, 1 of mutton, 6 of pork, 4 of veal, and 12 shoulders of ham. Legal proceedings were taken in three instances, affecting four persons, under Sec. 117 of the Public Health Act. Two of the cases were dismissed. In the other case the two defendants were each ordered to pay £5 including costs, or go to prison for a month.

The Sale of Food and Drugs Acts, 1875 and 1879, and the Margarine Act, 1887.—No action was taken under these Acts during the year 1895.

Factory and Workshops Acts.—Only 15 premises, coming under the title of *workshop*, were inspected, and registered as such during the year. It is estimated there are nearly, if not quite, 300 workshops in the district. So that the majority have not been dealt with as provided for by the Acts.

The following particulars have been furnished by the Senior Sanitary Inspector:—

List of Nuisances abated, and Sanitary Improvements (numbering together 3750) effected during the year 1895.

No.	
1925	Defective ashpits repaired—not roofed, without doors, or causing soakage.
26	Ashpans provided where privy refuse had to be carried through house.
339	Yards repaired and repaved.
83	Passages repaired and repaved.
371	Defective and untrapped gullies removed and replaced by proper sanitary syphon gullies
85	Blocked drains cleaned.
198	Defective and brick drains repaired and relaid.
216	Defective roofs, floors, &c., causing damp houses, repaired.
168	Defective spouting and down spouts, causing damp houses, repaired.
44	Sink waste pipes and rain-water pipes, running direct to drain, discontinued.
3	Foul pan water closets removed and replaced by proper earthenware sanitary closets.
16	Defective water closets repaired.
8	Water closets, with inadequate flush, provided with proper cisterns and larger flush pipes
10	Soil pipes ventilated.
6	Cesspools abolished.
34	Filthy yards and encroachments on yard area removed, caused by keeping fowls, animals, &c., so as to be a nuisance.
2	Smoke nuisances abated.
	Offensive accumulations.
128	dangerous hatchways, chimneys, walls.
25	Houses overcrowded.
21	Deficient water supply to houses.
7	Defective urinals.
	Privies abolished and water closets substituted.
24	Foul and filthy houses whitewashed and cleansed.
11	Houses without proper sanitary arrangements provided with same.

Defects were found in the following places visited:—Houses 965, school 1, hotels 16, works 2, chapel 1, stables 7, farm 1, tripe dressing place 1, vacant lands 9, garden 1, slaughter-houses 2, and passages 8. About 3042 visits were paid. The number of first notices issued was 890, and of final notices 318. The number of complaints received was 329. These related chiefly to ashpits and drains, and they received prompt attention.

In the course of the year—

735 Notices of infectious disease were sent to the School Board Offices.
969 Notifications of infectious disease were received.
237 Cases were removed to the Fever Hospital.
916 Houses were inspected (*re* infectious disease).
620 Houses were disinfected by the Sanitary Department.
115 Houses were disinfected and cleansed by occupiers, under orders from the Sanitary Department.

CONTAGIOUS DISEASES (ANIMALS) ACT.

During the past year 52 cases of alleged swine fever were reported. In accordance with new Regulations these were reported to the Board of Agriculture. After investigation, animals were declared to be suffering from swine fever in 29 instances—the affected animals were therefore slaughtered. The work in connection with this Act now occupies a good deal of time. Visits have to be paid to the alleged infected places, and where one notice had to be issued under the old, sometimes from 10 to 20 are necessary under the new Regulations.

I am, Gentlemen,

Your obedient Servant,

THOMAS HORNE, M.D.,

Medical Officer of Health.

(A) TABLE OF DEATHS during the Year 1895, in the STOCKTON-ON-TEES URBAN DISTRICT COUNCIL; classified according to Diseases, Ages, and Localities,

Names of Localities adopted for the purpose of these Statistics; public institutions being shown as separate localities. (*Columns for Population and Births are in Table B.*)	Mortality from all Causes at subjoined Ages.								Mortality from subjoined causes, distinguishing Deaths of Children under Five Years of Age.																					TOTAL
													Fevers.																	
(*a*)	At all Ages. (*b*)	Under 1 year. (*c*)	1 and under 5. (*d*)	5 and under 15. (*e*)	15 and under 25. (*f*)	25 and under 65. (*g*)	65 and upwards. (*h*)	(*i*)	Smallpox. 1	Scarlatina. 2	Diphtheria. 3	Membranous Croup. 4	Typhus. 5	Enteric or Typhoid. 6	Continued 7	Relapsing 8	Puerperal 9	Cholera. 10	Erysipelas. 11	Measles. 12	Whooping Cough. 13	Diarrhœa and Dysentery. 14	Rheumatic Fever. 15	Phthisis. 16	Bronchitis, Pneumonia, and Pleurisy. 17	Heart Disease. 18	Influenza. 19	Injuries 20	All Other Diseases. 21	22
No. 1.—PORTRACK WARD	97	35	27	2	6	20	7	Under 5													12	14		2	7	1	3		23	62
								5 upwds.																7	4	7	4	2	11	35
No. 2.—TILERY WARD	87	37	19	3	4	20	4	Under 5		4	2										1	14		1	4				30	56
								5 upwds.		2		1		1								1		6	4	3	2	1	10	31
No. 3.—VICTORIA WARD..	103	36	29	6	5	21	6	Under 5		2	2										7	14		3	12				25	65
								5 upwds.		2	1			1							1		1	6	1	3	4	2	13	38
No. 4.—SOUTH-EAST WARD	93	26	18	10	7	20	12	Under 5		1											1	7		4	9		1		21	44
								5 upwds.		2			1	1									1	7	8	6	3	3	17	49
No. 5.—NORTH-WEST WARD	101	42	11	4	4	28	12	Under 5		1											3	13		3	10		1		21	52
								5 upwds.						1									1	6	10	6	1	3	21	49
No. 6.—CENTRAL WARD	92	30	14	8	6	22	12	Under 5		1									1		6	12		3	6		1		14	44
								5 upwds.		3	1			2									1	8	9	6			18	48
No. 7.—EXCHANGE WARD	71	23	15	2	2	15	14	Under 5		2		1									2	9		1	10				12	37
								5 upwds.																5	6	6	1	3	13	34
No. 8.—WEST-END WARD	91	45	15	3	7	13	8	Under 5		2											6	23		1	5				23	60
								5 upwds.		1				4								2	1	6	5	2	1		9	31
No. 9.—PARKFIELD WARD	72	26	7	3	4	20	12	Under 5			1										5	12			3			1	11	33
								5 upwds.						2										6	8	2	1	1	19	39
No. 10.—SOUTH-WEST WARD	81	22	11	2	7	22	17	Under 5		1											2	8		1	6			1	14	33
								5 upwds.		1				1								1		8	6	9	2		20	48
FEVER HOSPITAL	16	..	3	7	4	2	..	Under 5		2	1																			3
								5 upwds.		5	1			7																13
SURGICAL HOSPITAL	38	..	2	1	9	21	2	Under 5																				2		2
								5 upwds.			1			1					2					1	1	3		17	10	36
WORKHOUSE	66	8	3	1	4	34	16	Under 5																1					10	11
								5 upwds.													1	1		11	10	4		1	24	55
Totals ..	1008	330	174	52	69	261	122	Under 5		16	6	1							1		45	126		20	72	1	6	4	204	502
								5 upwds.		16	4	1	1	21					2		2	5	5	80	75	57	19	33	185	506

The subjoined numbers have also to be taken into account in judging of the above records of mortality.

Deaths occurring outside the district among persons belonging thereto.	13	..	..	..	..	11	2	Under 5																						
								5 upwds.																1	1	3			8	13
Deaths occurring within the district among persons not belonging thereto	18	..	..	..	3	15	..	Under 5																						
								5 upwds.						1										1				12	4	18

Area in Acres, 3341. Population (1891), 49705. Death Rates—General, 18·5 per 1000 Population, estimated to middle of 1895; Infant (under one year of age), 149 per 1000 Births Registered.

(B) Table of POPULATION, BIRTHS, and of NEW CASES OF INFECTIOUS SICKNESS, coming to the knowledge of the Medical Officer of Health, during the year 1895, in the Stockton-on-Tees Urban Sanitary District ; classified according to Diseases, Ages, and Localities.

Names of Localities adopted for the purpose of these Statistics; Public Institutions being shown as separate localities.	Population at all Ages.		Registered Births.	Aged under 5 or over 5.	New Cases of Sickness in each Locality coming to the knowledge of the Medical Officer of Health.													Number of such Cases Removed from their Homes in the several Localities for Treatment in Isolation Hospital.												
	Census, 1891.	Estimated to middle of 1895.			Smallpox.	Scarlatina.	Diphtheria.	Membranous Croup.	Fevers. Typhus.	Fevers. Enteric or Typhoid.	Fevers. Continued.	Fevers. Relapsing.	Fevers. Puerperal.	Cholera.	Erysipelas.			Smallpox.	Scarlatina.	Diphtheria.	Membranous Croup.	Fevers. Typhus.	Fevers. Enteric or Typhoid.	Fevers. Continued	Fevers. Relapsing.	Fevers. Puerperal.	Cholera.	Erysipelas.		
(a)	(b)	(c)	(d)	(e)	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5	6	7	8	9	10	11	12	13
No. 1.—Portrack Ward	4625	4720	190	Under 5		24				1									2											
				5 upwds.		37				7	1								3				2							
No. 2.—Tilery Ward	4313	4385	147	Under 5		36	2			2									3											
				5 upwds.		75	1	1		24	6		1						23				8							
No. 3.—Victoria Ward	6055	6097	178	Under 5		35	2			1	1								11											
				5 upwds.		55	5			18	2								18	1			5							
No. 4.—South-East Ward	5730	5755	167	Under 5		21				2									7											
				5 upwds.		35			1	12									3				5							
No. 5.—North-West Ward	4480	4795	150	Under 5		27	1				1								3											
				5 upwds.		45	2			14	1								12				6							
No. 6.—Central Ward..	5897	7081	212	Under 5		19				1	1								4											
				5 upwds.		68	2			20	1		1						21				4							
No. 7.—Exchange Ward	4180	4430	116	Under 5		14	1	1		1									2	1										
				5 upwds.		22	1			7	1								7				3							
No. 8.—West-End Ward	5406	6766	218	Under 5		37				6									6				1							
				5 upwds.		65				41									17				16							
No. 9.—Parkfield Ward	4022	4595	124	Under 5		16	1			3									4											
				5 upwds.		25	2	1		6									11											
No. 10.—South-West Ward	4997	5370	128	Under 5		17				3	1								2											
				5 upwds.		49	5			16	2								9	1			4							
Fever Hospital	....	....	....	Under 5																										
				5 upwds.																										
Surgical Hospital	....	....	....	Under 5		2													2											
				5 upwds.		3	1			2									3				1							
Workhouse	....	....	....	Under 5		1													1											
				5 upwds.		4													4											
				Under 5																										
				5 upwds.																										
Totals	49705	53994	1630	Under 5		249	7	1		20	4								47	1			1							
				5 upwds.		483	19	2	1	167	14		2						131	2			54							